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THE JOURNAL OF COMPARATIVE MEDICINE AND VETERINARY ARCHIVES.

EDITED BY

W. A. CONKLIN, Ph. D., D. V. S.

RUSH SHIPPEN HUIDEKOPER, M. D., Veterinarian, (Alfort,)

NEW YORK.

DECEMBER, 1893.

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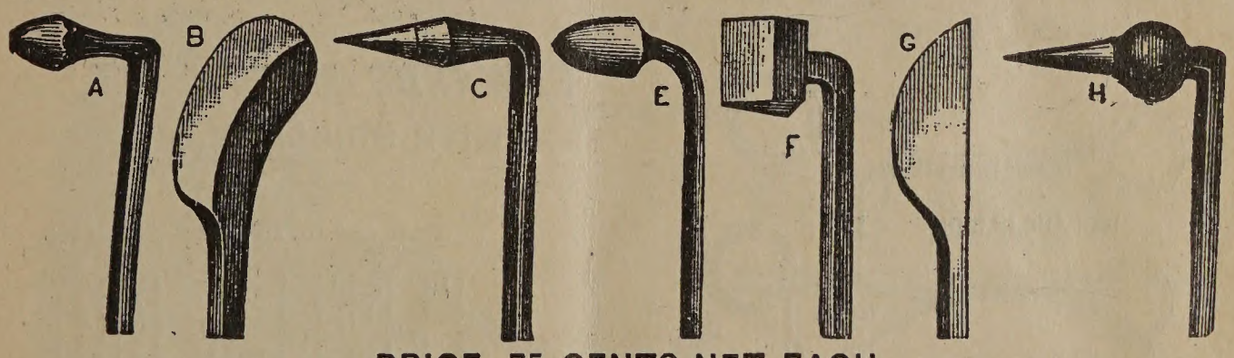

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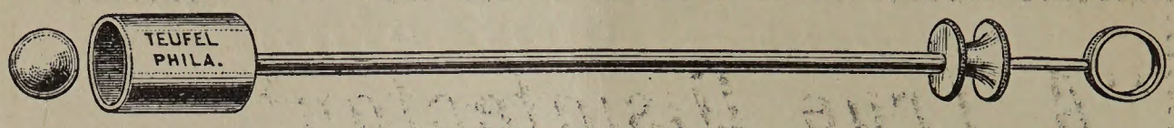

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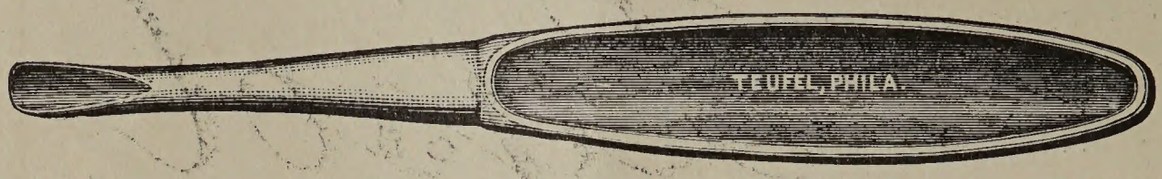

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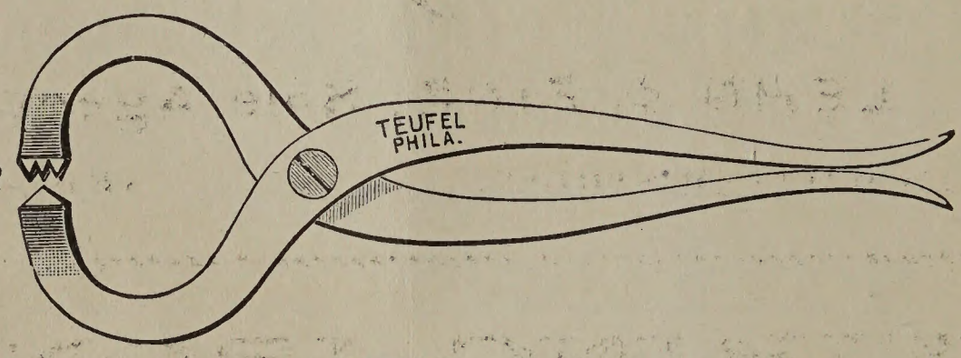

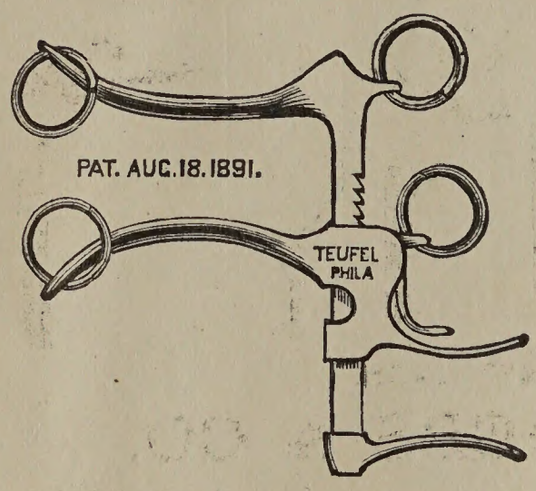

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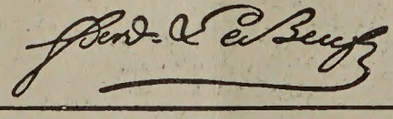

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VOL. XIV. DECEMBER, 1893. No. 6.

HYDRATED CHLORAL.—CHLORAL HYDRATE. CHLORAL.

BY JOHN R. ANDERSON, D.V.S.

To the veterinary practitioner this potent chemical compound is of far more value as a therapeutical agent than to the regular physician, as its administration to animals is unattended by any evil results, except when given in enormous quantities. Its field of utility is broad, and it will, with further investigation, prove, no doubt, to be of far more value than has as yet been demonstrated. Chloral appears in commerce in two forms; as a white translucent flake, and in transparent granules, both having a pungent nauseant taste. It is soluble in one and one-half times its weight in cold water at, say, 50 degrees Fahr. Much more so in hot water, but should never be dissolved in a medium warmer than 60 degrees Fahr. Alcohol, ether and glycerine also prove solvents for it, but not in so large quantity.

Chloral should never be incorporated with any alkaline substance as they decompose it, the resultant being chloroform and formic acid. Fixed oils prove fair solvents and good vehicles for its internal administration and local application. A 50 per cent. solution (watery) of hydrated chloral will preserve anatomical and morbid specimens indefinitely. When equal parts of chloral hydrate and gum camphor are rubbed together in a mortar, or they are mixed in fine particles and allowed to stand in a close-stoppered jar, a clear oily liquid results.

An equal part of tincture of iodine added to this mixture cannot be too strongly commended when applied to erysipelatous

swellings in the horse before suppuration takes place; always clipping the hair off, however, before applying and painting the parts daily, and confining the patient's head so that he cannot get at it with his mouth. It has no merit, I find, after the suppurative stage has been fully established.

One-half to one ounce of this oil proves most effectual in certain forms of non-organic visceral diseases.

Diluted with one pint of oil (raw linseed preferable), nothing is more effectual in simple spasmodic colic resulting from atmospheric influence, or pleuritic attacks, non-specific, in the primary stage, than six drachms hydrated chloral or one-half ounce of the camphorated chloral oil.

In the lower animals chloral exerts but little or no influence upon the cerebrum, as it does in man; its hypnotic influence can be said to be entirely lost. With rare exception we find a patient susceptible to its hynotizing effects. It acts feebly but certainly upon the cerebellum, and more perceptibly upon the medulla oblongata. Its influence is expended upon the nerve centres of the spinal cord almost in toto.

If an almost lethargical dose of chloral hydrate (say, an ounce to an ounce and a half) be given a horse suffering from abdominal pains, there first occurs a complete cessation of the pain; secondly, a decided disturbance of coördination, and thirdly, a suspension of voluntary motor power. This condition lasts from one to two hours, when the power of movement returns, and later a reëstablishment of coördination. When given in full therapeutical doses, it is followed, in from thirty to forty minutes, by a gradual diminution, and finally by a complete disappearance of all visceral pain; this is specially true if the lesion lies in the large intestine. The heart's action may drop a few beats, but this does not occur often; the volume is usually slightly diminished instead. Respiration is affected proportionately with the heart. No alteration of the body heat is perceptible, nor does there occur any disturbance to peristalsis. Elimination of the drug takes place chiefly by the kidneys, partially through the skin. The camphorated chloral oil with one-third part olive or cotton-seed oil added, gives great relief when applied to painful wounds of the feet in horses and cattle.

At the onset of enteritis, peritonitis, cystitis, metritis, and in fact all painful affections within the cavities which are of an inflammatory type, functional and dependant upon local causes, the symptoms are greatly relieved and sometimes cut short by a full dose of chloral hydrate.

After the stage of effusion it is of no value, however, except in the ratio as it temporarily relieves pain. In those cases of muscular rigidity, from clonic spasms, resulting from uterine irritation (so-called) and reflection, which we so often meet with in bitches after whelping, there is no agent or agents in the whole pharmacopœia which gives such prompt, entire and permanent relief as does a full dose of chloral hypodermically administered. The quantity regulated according to body weight of the dog. Six to ten grains for a 10 to 20 pound dog; 10 to 15 grains for a 20 to 60 pound dog; 15 to 20 grains for a 60 to 125 dog, so on. I once gave a bitch weighing 128 pounds, in 20 grain doses, 80 grains within 30 minutes. But the patient was extremely rigid, and had been for 24 hours previous to her being brought to me. The hypnotic influence of the drug in this case was manifested, but not so profound that it was difficult to arouse the bitch from sleep, which by the way resembled natural sleep more closely than that produced by other drugs. Strychnia poisoning, so common to dogs, can be most certainly and successfully combated by this agent.

The toxicological effects of strychnia are antagonized through their entire range by chloral hydrate, and it can be stated with impunity that in strychnia poisoning of dogs, if there is a vestige of life left, with the hypodermatic injection of a sufficient quantity of chloral, the patient cannot, will not die. In my practice it has occurred that the initial dose was necessarily large for the pound weight of the dog, but by carefully watching the effects of the drug and being guided therefrom as to each successive dose, the results obtained have been without an exception gratifying in the extreme.

Six or seven years ago, while in conversation with a man who had been engaged in shipping as an attendant with horses to and from the central blue grass region of Kentucky to New York and California, he described a condition as occurring frequently among horses in his care, which he was wont to call insanity from fright. He said after being loaded on the cars and fairly on their journey, the subjects in question would become restless, break out in a profuse perspiration, tremble from head to foot, grow violent and finally die with their jaws locked, and the muscles of their bodies as rigidly contracted as if they had tetanus, unless they were unloaded at the first station and something done for them. In questioning him I learned that in every instance those affected were horses that had been taken up off of grass pastures only a

few days before shipping, or else they were brood mares shipped to or from the stud, and that they were at the time of the attack well into the œstral period. It was not until 1889, however, that a case of this character came under my observation The veterinary surgeon in charge was treating it with cold water showers over the body and some medication bv the mouth. The treatment was unsuccessful, as others thereafter proved. In 1890 I was asked to attend a brood mare that had been led a distance of 4 or 5 miles to be bred. The superintendent stated that she had gone along quiet, but on reaching the farm they were unable to get the bit from her mouth, and at that moment she was trembling, sweating, and could not stand still.

On reaching the place, this case was a most urgent one. She had been turned loose into a box stall; her jaws were locked, every muscle of the body on the surface could be outlined; the successive contractions of the muscles of the limbs were so violent, and co-ordination so disturbed, that it was with the greatest difficulty that she was enabled to maintain the standing posture. Her head was protruded and the membrana nictitans was so drawn as to completely cover the globe. Drenched with perspiration she was a miserable picture of agony. She could not remain quiet one moment; and with difficulty and the loss of two syringe needles I succeeded in getting chloral hydrate, one half ounce in one ounce of water (cold), under the skin. Within 15 minutes she was able, with some effort, to stand still; 20 minutes more and she could direct her steps; 10 minutes more the membrana nictitans had gained its normal position; and in one hour and five minutes not a symptom was left to betray the fearful condition which had existed a little more than an hour previous. This subject weighed about 950 pounds.

Since that date the number I have treated will not fall far short of a half hundred, and it has been necessary with a few to give six drachms before obtaining the desired result; but I have always been rewarded by success. Abscesses invariably follow the hypodermatic use of chloral, but they heal rapidly, so soon as the sack is emptied. In localities where the horse reaches 14 to 20 hundred weight, I think it safe for practitioners to make the initial dose from six to eight drachms, hypodermically, according to the severity of the attack. For the benefit of breeders and shippers to any distance, who are not in a position to secure the services of a qualified man, I would suggest that before starting valuable mares or horses, just from the grass fields, on long journeys on

the cars, they should provide their attendant with a cheap hypodermic syringe and one or two one ounce bottles containing chloral hydrate, one-half ounce and water one ounce, with instructions how to insert the needle into the skin. The treatment is a safe. simple and certain one, unattended by any evil results, save the abscesses, and they are of no consequence in reality, and can be attended to so soon as the animals reach their destination. Always insert into the skin of the breast, low down, as the abscesses are not so large when the point of origin is located dependently and they drain much more easily.

Three hundred and twenty grains of chloral swallowed, dissolved with two ounces of water in a graduating glass, by a man who was a perfect athlete, with suicidal intent, did not prove fatal. Profound hypnotism occurred in twenty minutes. The subject came into my room immediately after taking the dose and lost consciousness shortly thereafter. I gave him, hypodermically, ¼ grain of strychnina sulphate and sent in haste for an M. D., who responded promptly. We learned the quantity he had taken and gave ½ grain more sulphate of strychnine. Oxygen gas was given by inhalation and the faradic current applied continuously. The dose was swallowed at 7 o'clock A. M. It was 3 o'clock the next morning when he aroused, which he did of his own accord, and was, to all appearances, as if he had awakened from a natural deep sleep. He sat up in bed without assistance, conversed with me about what he had done for five or ten minutes, lay down fell asleep again, and awoke at 6.30 A. M.

Why his œsophagus was not excoriated from contact with so concentrated a solution is difficult to understand. His stomach being filled with beer, as he stated afterwards, accounts for no injury being done to that organ. Frequently during the twenty-four hours it was necessary to introduce the catheter into his bladder as he could not void his urine. He complained of nothing else, nor of any ill state of being during his recovery.

The case is an instructive one, since we know that there are cases on record, in man, in which death was produced by twenty grains of hydrated chloral, and the usual quantity given to man therapeutically is ten to fifteen grains.

Phœnix Hotel, Sixth Street,
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GLANDERS–FARCY AND MALLEIN.

A Clinical Lecture.

By Simon J. J. Harger, Professor of Anatomy and Zoötechnics, Veterinary Department, University of Pennsylvania.

Gentlemen :—Perhaps in the whole category of the contagious diseases of the horse there is none so insidious in its onset, and at times difficult of recognition, as that of glanders. Now, first of all, you will remember that the various diseases designated by the name of acute glanders, acute farcy, chronic farcy, and chronic glanders are one and the same thing. They are identical. The difference being that farcy manifests its lesions on the external integument, while glanders has its lesions in the internal organs and the respiratory mucous membranes. Glanders is found in a very large number of animals. You will find it in the horse, the ass, the mule, the dog, the cat, in sheep, in goats, wolves and lions. It is said not to have existed in pigs, although recently a few cases have been reported. Cattle and barnyard fowls are exempt. A case of glanders in cattle has never been known. As you know it is also found in the human being. In the mule and in the ass we seldom see chronic farcy or glanders; it nearly always assumes the acute form. In the dog it may be generalized, and in some instances, however, it may remain localized at the seat of inoculation; the ulcers may heal and the animal afterwards be perfectly healthy. In the human being likewise it is usually generalized and fatal, although in rare cases it has remained localized and the individual has in those cases made a supposed recovery. Whether the recovery is absolute or whether it is only on the skin with some internal lesions still existing, are questions which yet remain to be determined.

The aetiology of this disease I suppose you have already studied. The predisposing causes are anything that tend to weaken or debilitate the system. I may mention working in cold rain, or in cold weather, unhygienic stables, poor feeding, excessive work, and the

like. The exciting cause is the bacillus malleus, one of a large category of germs which produce such a large number of diseases.

The symptoms of farcy and glanders are, when they are characteristic, very characteristic; when they are not characteristic, they may be very obscure and there may be some difficulty in making a diagnosis. We have, however, in farcy a certain number of cardinal symptoms which are *four* in number. The first one of these is the *farcy bud.* In this case we find a number of them on the inside of the hind leg, which are small inflammatory foci or nodes in the subcutaneous tissue, varying in size from a hazlenut or a pea up to a walnut. These are at first hard and shot-like, and as they increase in size there is a gradual softening and suppuration in their interior, as the result of the cell proliferation, until the farcy bud is converted into an abscess. The pus having formed, the skin commences to necrose, sloughs off and leaves an *ulcer* which varies in size from a half-dime piece up to that of a silver dollar. Here for instance is an ulcer almost healed which is very small. On the inside of the hind leg you see small ulcers which are just commencing to ulcerate. If the ulcer refuses to heal for a long time the skin around gradually sloughs away until it reaches quite a large size.

Now you will see also the peculiar form of this ulcer, that it is irregular, that it is not round as an ordinary ulcer, but that its borders are irregular, zigzag, and that its edges instead of sloping away from the ulcer, as they do ordinarily in non specific ulcer, are perpendicular, and sometimes they overhang a surface of the ulcer. The bottom of the ulcer is of a greyish red or purplish color, which is rough and uneven.

The third symptom is the *discharge.* The discharge is purulent, or what might be termed purulo-albuminous. The characteristics of the discharge are a thick, viscid, albuminous, transparent substance which rolls down over the skin below, to which it has no tendency to adhere, and looks somewhat like olive oil. If you open one of the buds with a knife the discharge which comes from the abscess, instead of staining the skin and hair as it runs down, scarcely leaves any marks on its track. For instance, here we have a discharge at that point and the hairs are soiled only in certain places, while in other places they are perfectly clean. This is known to be a characteristic of the pus, a peculiarity which you do not find in any other discharge.

If you put your hand on the inside of the thigh of this horse you can feel the inflamed lymphatics in the form of thin cords

running up towards the inguinal region to the lymphatic glands of the groin. These cords may gradually disappear or they may ulcerate. The inguinal glands may share the same fate and become indurated and enlarged. If you will examine this horse you will find that they are hard, indurated and nodulated. The ulcers, at times, have this important peculiarity, which you must not forget ; in the course of a certain length of time they may heal : they may cicatrize and leave nothing but a star-shaped cicatrix, and you are led to believe that your patient has made a good recovery. The ulcers may cicatrize as rapidly as new ones form, and the whole area may be spotted here and there with cicatrices generally. However, this is a case that will deceive you. Although the integument may show the absence of any lesion, if, at the same time, the horse has any tubercules in his lungs, he is capable of transmitting the disease and of infecting other horses with which he is brought in contact.

There was a horse in this hospital some years ago affected in exactly a similar manner, and a large number of ulcers developed on one of his hind legs—ulcers which readily cicatrized, healed, disappeared, and the horse apparently recovered. However, that horse was turned out to pasture and not only did he infect other horses, but in the course of five or six weeks he developed into a beautiful case of glanders. Thus you may have apparent recovery from glanders; your animal may appear perfectly healthy; he may show no sign of any disease; still during all that time he is a source of infection and may continually affect horses which are brought in contact with him. The absence of visible symptoms is no positive indication of the absence of glanders. This is the form which is called *latent* or incipient glanders, so called because there are no apparent symptoms. We have a number of occasional premonitory symptoms, such as acute lymphangitis with swelling of the extremities (usually the hind),which may come on in twenty-four or forty-eight hours. Bleeding from the nose without any apparent cause is also suspicious. Orchitis, inflammation of the testicle, in the entire horse, which may come over night or in the course of twenty-four or thirty-six hours, is also suspicious. These, however, are merely secondary symptoms.

This horse which you see here, as I have already said, was brought here from a stable where glanders exists; a stable from which two other horses were here in the hospital a few weeks ago suffering from glanders—farcy. The symptoms were not very marked. There was a slight swelling on the members. There

were two ulcers on the skin, but no other symptoms. The nasal septum and the submaxilliary glands were normal. The general condition of the horse was that of cachexia; besides that we had the history of glanders. From these facts a diagnosis of glanders was tolerably positive. However, in order to be more certain of the diagnosis, I injected this horse as well as the other two with mallein.

Mallein was first prepared in 1891 in the Bacteriological Laboratory of the Veterinary School at Dorpat by a prominent and enthusiastic investigator, Kalning. This investigator prepared his mallein as follows: He took 5gm. of a pure glanders bacillus culture, to which he added 20ccm. of sterilized distilled water. This was exposed to a temperature of 120 degrees C. for 20 minutes, and repeated four times during the succeeding forty-eight hours. It was then exposed for forty-eight hours to 39 degrees C. and filtered through a Pasteur filter with the aid of a vacuum pump. The filtrate, consisting of 12cm., was now exposed to a temperature of 120 degrees C. for 15 minutes and was then ready for injection. You will note, as we have already learned, the effect of excessive heat on the attenuation of the virus.

With this lymph he injected three horses, artificially inoculated with glanders, with 1cm. each; in 10, 12, and 13 hours, respectively, there was a rise in temperature of 2 degrees and 2.7 degrees C.; a healthy horse injected simultaneously showed no rise in temperature. The accuracy of the lymph was then demonstrated by a post-mortem. Unfortunately this investigator himself died of glanders a short time afterwards from accidental inoculation. In handling glanderous material you can never be too careful about your own person. Subsequently other investigators followed, among them was Preusse, the German investigator, and one of my colleagues, Dr. Pearson. Preusse's lymph was made from potato culture of the bacillus dissolved in equal parts of glycerine and water. It was used in the form of a solution, one part to ten parts of a two per cent. solution of carbolized water. With this material he injected guinea pigs as well as horses. He injected six horses which showed no characteristic symptoms, and the diagnosis was quite uncertain, with 1 to 3ccm. of the lymph, followed in 7½ hours by a second injection of 3 to 5ccm. In 5 of these, in the course of 15 hours, there was a rise in the bodily temperature of from 3 to 5 degrees C. The post-mortem proved the existence of glanders, whilst in the sixth, which was a foal two weeks old, there was no rise in temperature and no disease was found on post-mortem examinations.

Other investigators, among them Shilling and Dickerhoff, used the lymph in the same way in doses of from 1 to 3cm. on 112 horses. Of these 112 horses, 66 showed an elevation of the bodily temperature. Of these 66, 63 showed by a post-mortem that they were affected with glanders. The remaining three did not show any lesions of glanders, and in two of them no lesions at all could be found; in the third there was a slight tubercular deposit in the lungs, but the inoculation of a guinea pig produced a negative result. Still that is not positive in view of the fact that inoculation of the glanderous material in guinea pigs is not always positive, and an inactive inoculation is no positive proof of the absence of glanders. The temperature in all these cases reached its maximum in from nine to ten hours. There were also slight constitutional symptoms, as dullness, slight shivering, and a certain amount of inappetence. The remaining 46 showed no elevation in temperature, and on post-mortem were found to be perfectly healthy.

The most thorough investigation with mallein was made by the French investigator, Nocard. A strong solution of mallein was made by him in this way: A culture of the bacillus in peptonized glycerine bouillon (the same as for tuberculine) was exposed to a temperature of 35 degrees C. for one month. At the end of this time it was sterilized at a temperature of 110 degrees C. It was then filtered through paper and evaporated to one-tenth of its volume in a vacuum and in the presence of sulphuric acid. You will thus see that this preparation was a very strong lymph. It was used medically in a ten per cent. solution of carbolized water. The carbolized water was made of five parts of carbolic acid to one thousand parts of water, so as to diminish the irritating effects of this material. The dose of this lymph is about a quarter of a ccm. A large dose, one-half to one ccm., produced in a normal horse a slight inflammatory swelling, which disappeared in from one to two days, and a rise in temperature of from 1 to 2 degrees C. You will see that you have here a reaction in the healthy horse, but the dose is much too large. A quarter of a ccm. in a healthy horse produces no reaction, while in subjects with glanders or farcy it produces a decided reaction. Hence, here was the difference of the action on the healthy and on the diseased horse on which the diagnostic value of the material is based.

In this manner Nocard injected 48 horses; in 34 there was an elevation of temperature of from 2 to 3 degrees, and after death he found glanders. Eleven showed no results whatever, no fever

and no disease. The remaining three were at first somewhat disappointing. There was respectively an elevation of temperature of 1 degree, 1.4 degrees and 1.8 degrees. The post-mortem examination, however, demonstrated that these animals suffered from bronchitis, strangles and melanosis, to which the slight rise of temperature was then attributed. Subsequently experiments were made on diseased animals, animals suffering from bronchitis, pleurisy, collection of the nasal sinuses, sarcoma of the jaw, etc., with negative results. There was in these cases no rise in temperature which could be mistaken for that which results from glanders or farcy.

In one case he experimented on a horse which had "enlarged gland" (but I could not find out what the enlargement was due to), and after three successive injections there was a rise in temperature of 1 degree. The submaxilliary gland was then removed and the horse again injected with no reaction; the presence of the diseased gland evidently in that case had been the cause of the slight rise in temperature.

Mallein contains an active principle to which, if not the entire, at least part of its activity is due. This active principle is precipitated by alcohol as a flocculent deposit, filtered, and then washed with sulphuric acid; it then exists as a white crystalline alkaloid—it might be termed alkaloid—very soluble in water, in which it makes a slightly yellowish solution. As it is ordinarily prepared, mallein contains about 1½ per cent. of this alkaloid, for which as yet nobody has been ambitious enough to discover a name. This same alkaloid exists in the serum of the organs of horses that have died from glanders. Its physiological effects on the animal economy is the same as that of mallein. It is used in doses of 0.15gm.

The mallein of which I have here a sample, given to me by the Bureau of Animal Industry, is a slightly yellowish, syrupy, citron-colored fluid of a peculiar odor and of a neutral or slightly acid reaction. The method by which it was prepared I do not know; but in all cases the process is the same, the primary object being to obtain a solution of the ptomaine or poisonous principle that is excreted by the bacillus. This mallein when injected in doses of 1ccm. in a healthy horse produces but little effect. It may produce a slight local swelling, which passes off in a day or two, and an occasional rise of temperature of from ½ to 1 degree C. In the diseased animal it produces marked symptoms. In the first place it causes, at the point of inoculation, a large, hard, hot,

limited inflammatory swelling which varies in size from a hen's egg to a child's head, which in the course of 48 hours gradually disappears, and may not show any trace after five or six days. The temperature may rise from 3 to 6 degrees F. If there is a rise of temperature of no more than 1 degree C., the animal is not diseased and you cannot make a diagnosis of glanders. A rise of temperature of between 1 and 2 degrees C. is suspicious, but not positive, and the animal must show a rise of temperature above 2 degrees C., or at least 103 F., in order to be of any positive value.

Before arriving at a definite conclusion, if the reaction is not decided, it is best to make in the course of 24 hours a second injection, and if necessary in 24 hours more a third injection, in order to demonstrate absolutely whether the fever is due to a diseased condition or merely to the activity of the lymph itself. The best time to make the injections is in the morning. When you inject a diseased horse it is well to inject a healthy horse also. The dose of this lymph is 1ccm.

I have here a record of its effect on those horses which I have injected. First of all, I will call your attention to the table showing the action of the lymph of a healthy horse.

TABLE NO. I.

*Showing effects of mallein on a healthy horse.**

	July 4th.						July 5th.					
	8 p.m.	10	12	2	4	6	8	10	12	2	4	6 p.m.
Pulse,	38	40	44	44	40	46	40	38	40	42	42	44
Temperature,	16	16	18	16	14	15	16	14	20	14	14	16
Respiration,	38.4	38.3	38.2	38.3	38.5	38.4	38.5	38.7	38.6	38.5	38.6	38.6

Injected at 8 p. m., July 4th, 1892, 1 gm. mallein. Second injection, 8 a. m., July 5th, 2 gm. mallein.

The first inoculation was made on the 4th day of July, 1892, the dose was 1 gm. mallein; the second on the 5th, at 8 A.M., two successive inoculations. The chart shows the state of the pulse and the number of respirations. You will notice the pulse is always uniform, never passing above 44, and you will also notice there is little or no alteration in the respiration and the temperature; no local alterations.

* Monatshelfte fur practische Thierheilkunde.

TABLE NO. II.

Before Injection.			When Injected.			After Injection.		
Date.	Time of day.	Temperature.	Date.	Time of day.	Temperature.	Date.	Time of day.	Temperature.
Aug. 21,	12 m.	100.4	22 (Aug.)	6 a.m.	100.	Aug. 22	8 a. m.	100.
"	6 p.m.	100.4	1 c. c. mallein.			"	10 a.m.	100.
"	10 p.m.	101.	....	....	....	"	12 m.	100.9
....	...	....	....	....	....	"	2 p.m.	102.4
....	....	....	....	...	....	"	4 p.m.	104.2
....	....	....	....	....	....	"	6 p.m.	106.
....	....	....	....	....	....	"	8 p.m.	105.8
....	....	....	....	....	....	"	10 p.m.	105.4
....	...	....	....	....	....	"	12 p.m.	104.7
....	....	..	....	....	....	Aug. 23	6 a.m.	104.
....	....	....	....	..	....	"	9 a.m.	104.6
....	...	....	....	....	....	"	10 a.m.	104.1
...	....	....	...	....	....	"	12 m.	104.2
....	....	....	....	....	....	"	2 p.m.	103.6
....	....	....	....	....	....	"	4 p.m.	103.8
....	....	....	....	....	....	"	6 p.m.	104.3
....	..	..	....	....	....	"	8 p.m.	105.
....	....	....	....	....	....	"	10 p.m.	104 6
....	....	....	....	....	....	"	12 p.m.	103.6
....	....	....	....	..	....	Aug. 24	8 a.m.	102.8
....	....	....	...	....	....	"	12 m.	103.
....	...	....	....	....	....	"	2 p.m.	103.
....	....	....	....	....	....	"	4 p.m.	103.2
...	....	....	....	....	....	Aug. 25	8 a.m.	101.9
....	...	...	....	....	....	"	12 m.	101.6
....	....	....	...	....	....	"	4 p.m.	101 9
....	....	....	....	....	....	Aug. 26	8 a.m.	100.1
....	....	....	....	....	....	"	12 m.	100.2
....	....	...	....	....	....	"	4 p.m.	101.

TABLE NO. III.

Before Injection.			When Injected.			After Injection.		
Date.	Time of day.	Temperature.	Date.	Time of day.	Temperature.	Date.	Time of day.	Temperature.
Aug. 22,	12 m.	100.9	Aug. 23,	6 a.m.	100.2	....	....	....
"	2 p.m.	101.	1 c. c. mallein			23 (Aug.)	9 a.m.	101.6
"	4 p.m.	101.2	....	....	....	"	10 a.m.	101.8
"	6 p.m.	101.4	....	....	....	"	12 m.	102.
"	8 p.m.	101.7	...	...	....	"	2 p.m.	103.6
"	10 p.m.	100.9	....	....	....	"	4 p.m.	104.8
"	12 p.m.	101.	....	..	.. .	"	6 p.m.	105.
....	....	....	....	....	....	"	8 p.m.	105.
....	...	....	....	....	....	"	10 p.m.	104.8
....	....	....	....	....	....	"	12 p.m.	103.8
....	....	...	....	....	....	Aug. 24	8 a.m.	103.
....	....	....	....	....	....	"	10 a.m.	103.4
....	....	....	....	....	....	"	2 p.m.	104.
....	....	....	....	....	....	"	4 p.m.	103.4
....	....	....	.	....	....	Aug. 25	8 a.m.	102.
...	....	....	....	....	....	"	12 m.	102.1
....	....	....	...	....	....	"	4 p.m.	101.8
....	....	....	....	....	....	Aug. 26	8 a.m.	101.9
....	..	....	....	....	....	"	12 m.	102.
....	....	....	....	...	....	"	4 p.m.	102.

These cases were suspicious of farcy-glanders, but the symptoms were not marked.

The local symptoms were as follows:

After the injection a swelling developed at the seat on inoculation about the size of a hen's egg, and it increased a little up to ten P.M. On the 24th, at 8 A.M., it was twice as large as on the preceding day. On the 25th, at 12 M., it was smaller, and on the 26th was the size of a walnut and practically had disappeared.

TABLE NO. IV.

Before Injection.			When Injected.			After Injection.		
Date.	Time of day.	Temperature.	Date.	Time of day.	Temperature.	Date.	Time of day.	Temperature.
Sept. 21,	12 m.	104.8	....	....	....	...	...	....
Sept. 22,	"	102.	Sept. 23,	9 a.m.	102.2	Sept. 23,	10 a.m.	102.2
....	....	....	1 c. c.	....	....	"	12 m	102.2
....	....	....	....	...	....	"	2 p.m.	101.4
....	....	....	....	....	....	"	4 p.m.	101.
....	....	....	....	. .	....	"	6 p.m.	102.
....	....	....	....	....	....	"	8 p.m.	103.6
...	...	....	....	...	....	"	10 p.m.	103.8
....	....	....	....	....	....	"	12 m.	104.4
....	....	....	....	....	....	Sept. 24	6 a.m.	102.8
....	...	....	....	....	....	"	8 a.m.	102.2
....	....	....	....	. ..	....	"	10 a.m.	102.2
...	....	....	....	....	....	"	12 m.	102.2
....	....	....	....	.	....	"	2 p.m.	102.
....	....	....	....	....	....	"	4 p.m.	101.4
...	....	...	....	....	....	"	6 p.m.	102.2

Now we have a third case, the one which we studied a minute ago, which is not as positive in its reaction from this lymph as the other two preceding, and we did not use the greatest precaution in this case. Firstly, for the reason that on September 21st, at 12 M., two days before the inoculation, the temperature was 104.8 degrees Fahr. On September 22d, at 12 M., the temperature was 102 degrees Fahr. Now, in order to be more accurate, the temperature of this horse should have been taken the next day, and the next day, until it had been uniform for a certain number of days in succession, in order to obtain the actual temperature prior to the inoculation, the actual temperature uninfluenced by accidental conditions. The animal was injected on the 23d, the bodily temperature being 102.2 degrees Fahr., at ten A.M., with 1 c. c. of mallein. The temperature was quite high for a chronic case. One hour afterwards the temperature was the same, 102.2 degrees. It was taken successively every two hours, and reached its maximum at 12 P.M., or 15 hours after the injection, when it was 104.4 degrees Fahr., only a rise of 2.2 degrees. This was a small rise, and had it been a case involving a great deal of importance and reputation another injection should have been made the next day, in order to ascertain whether there would be a greater elevation

of temperature. In this case we did not consider it necessary, and I did not repeat the injection. The local symptoms were the same as in the other cases. The horse is now killed and the post mortem made, and although the action of the mallein was not as decisive as might have been, we now see that the diagnosis is correct, after a few tubercles in the lungs and lobular (triangular) pneumonia are found to exist.

I wish to say one word more as to the practical value of mallein under certain conditions. First, if you find farcy or glanders in a stable, such as is in the stable where this horse came from, you will destroy those absolutely diseased. It would be economy for the proprietor of such stable to employ a veterinarian, and have him inject, with mallein, every animal in the stable; and for this reason, as I said a while ago, that the animal may be in an apparently good condition, as far as one is able to see, and nothing may be detectable, at the same time that he may be the source of a serious and constant inoculation that may infect all the other animals in the stable. It is only possible in such cases to demonstrate the existence of the disease by one or more injections of this lymph. I know a stable in this city now where glanders exists, and where I saw a horse with absolutely characteristic ulcers on a hind pastern, which apparently had been cured, but I venture to say that an injection of mallein would successfully demonstrate the existence of latent glanders. I have collected 191 cases, which have been treated with mallein. The results of the injections were positive in all with the exception of the two which I have previously mentioned.

CUTEREBRA EMASCULATOR IN DOG.

By Cecil French.

Secretary-Treasurer Montreal Vet. Med. Association.

I beg to inform you of the occurrence of the larva of a bot-fly in the testicle of the dog. It was extracted from the scrotum at the College clinic here. I forwarded it to Prof. Fletcher of the Experimental Farm at Ottawa, and he pronounced it to belong to the Genus Cuterebra, individuals of which are known to infest squirrels, hares and mice, but he had never heard of a dog being previously affected.

An article on "Cuterebra Emasculator" appears in the U. S. Bulletin, "Insect Life," for January, 1889.

The dog was apparently indifferent to the fact that the parasite was slowly emasculating him.

REPORT OF THE TUBERCULOSIS COMMITTEE.*

By A. W. Clement, V.S.

Mr. Chairman :—The subject of this communication, tuberculosis, is now universally admitted to be an infectious disease, manifested by definite clinical symptoms and characterized by certain anatomical changes in the tissues, due to a specific micro-organism known as the tubercle bacillus.

The first important study of the disease was made in the first part of the present century, when Boyle and Läennel declared tuberculosis to be a separate affection, due to the deposit of tubercles. a specific product independent of ordinary inflammation.

Then followed the discovery of inoculation by Läennel, the inoculation experiments of Villemin, the diagnosis of pulmonary tuberculosis by the presence of elastic tissue in sputa of phthisical patients, and finally the most brilliant achievement of modern medical science, the discovery by Koch, in 1882, of the cause of tubercle and the etiology of the disease. This brilliant discovery set at rest all doubts as to the nature of the disease and proved beyond all question the indentity of the disease in all animals.

The tubercle bacillus gives rise to anatomical changes either in the form of milliary tubercles or in caseous inflammations. It produces secondary infection either by being carried in the blood current to other parts of the body or by traveling along natural channels. The most common form of primary infection in cattle is in a caseous bronchitis or broncho-pneumonia, or in calves more commonly in the form of tabes mesenterica.

The disease is world wide in its distribution and probably affects all classes of animals. It has received much and is daily receiving more and more the attention of governments as an enemy which probably destroys more lives annually than all of the so-called scourges and wars put together. Many conflicting reports have been published as to the extent of the disease among the cattle of this country, but most of them are based upon too insufficient data to make them of much value. We have no regular inspection of herds nor a complete inspection of meat. It is only possible to glean facts relating to the extent and distribution of the disease incidentally, when cattle are examined with other ends in view. Even if we had an organized inspection of herds, the results of such an inspection would not teach us how much tuberculosis is present among our cattle, because the disease is notoriously hard to discover in the living animal, except when advanced,

* United States Veterinary Medical Association, October, 1893.

and breeders and farmers who have had some experience with it are clever enough to remove animals that show the first suspicious symptoms. It is only possible by an extensive examination with tuberculin or through a thorough and well organized system of meat inspection that reliable statistics can be obtained. Some herds have been reported as showing a very small proportion of animals afflicted, while in others the proportion reported has been frightfully high.

We are warranted in saying that tuberculosis is quite prevalent in some regions, that occasional cases occur almost everywhere, and that the disease seems to be spreading.

The great dangers from tuberculosis in cattle are, first, its transmission through the meat and milk to man, and, second, its transmission from diseased to healthy cattle.

From the standpoint of public health, both of these questions are of vital importance, for the first depends to a great extent upon the latter. The importance of the maintenance of such a system as would keep the public informed of the dangers from animals suffering with disease communicable to man, demands that our profession be represented on City and State boards of health equally with the medical profession.

While it is quite proper that State Governments should protect its citizens as much as possible against diseases transmissible from the lower animals to man, yet any effort on their part must of necessity amount to but little, without the hearty co-operation of the National Government. Some means for obtaining fairly reliable statistics of the number of animals affected should be devised and a much more generous spirit should be manifested toward the scientific investigation of these subjects by the Department of Agriculture. The Bureau of Animal Industry should not be hampered by lack of facilities for carrying on the work, and its employees should be chosen on account of their special fitness for the work and not for purely political reasons. Then and then only will the work which can be so well done by this bureau have its effect, and redound to the credit of the veterinary profession of the United States. Though much has been accomplished by the earnest endeavors of many of those connected with the bureau, yet the public has a right to demand, and we believe soon will demand, that the field of research be more fully covered and that it be conducted on purely professional and scientific principles.

Dr. D. E. Salmon, Chief of the Bureau, has very kindly fur-

nished this committee with the advance sheets of Bulletin No. 3, entitled, "Miscellaneous Investigations Concerning Infectious and Parasitic Diseases of the Domesticated Animals," in which appears an article on "Some Experimental Observations on the Presence of Tubercle Bacilli in the Milk of Tuberculous Cows when the Udder is not Visibly Diseased," by Drs. Theobald Smith and E. C. Schroeder.

The milk from six tuberculous cows was inoculated into guinea pigs with the following results:

From cow No. 155, which presented marked symptoms of the disease, and which at the autopsy showed very advanced lesions, five guinea pigs were inoculated, one of which, inoculated two days before the death of the cow, became infected.

Cow No. 156, which had very extensive tuberia, proved negative in the inoculation of four guinea pigs. Two pigs fed with the milk of these cows failed to contract the disease.

Cow No. 233, which had advanced general tuberculosis with slight infection of the udder glands, gave positive evidence in eight guinea pigs and negative results in two.

Cow No. 234, which had extensive tuberculosis, with udder glands normal, gave negative reaction in nine guinea pigs inoculated.

Cow No. 303, which presented moderate tuberculosis but with infection of the lymph glands behind the udder, gave negative results in one guinea pig, the only one inoculated.

Cow No. 314, in which tuberculosis was present in a moderate degree, but in which the udder was not affected, gave negative results in the one guinea pig which was inoculated.

To summarize these, positive results were obtained in guinea pigs by the inoculation of the milk from two cows and negative from the other four cows. One of the cows giving a positive result (No. 303) had tuberculosis of the lymph glands just back of the udder. These experiments were conducted under strict antiseptic precautions and are valuable.

DR A. W. CLEMENT, Chairman.

Dear Doctor:—In May and June, 1892, I fed two half-grown pigs on milk from a cow with tuberculosis for a period of seven weeks. The pigs were afterwards kept for nine weeks before being slaughtered. Two other pigs from the same litter and of very nearly the same size were kept in the same stable, but in a different pen, and were fed on grain. The four pigs were slaughtered Sept.

30th, 1892. It was found that the pigs which received the milk, having had a balance ration, had grown rapidly and were large and fat, while the pigs fed on grain (principally corn) had suffered from the absence of proteids in their food, and were small and thin. The autopsies showed the two thin pigs, which received no milk, to be healthy, and the two fat pigs, which were given milk, to have tuberculosis of the post-pharyngeal lymph glands, and in one of them the mesenteric glands were tuberculous as well. The post-pharyngeal glands in each case were of the size of a goose egg, cheesy, and with softened creamy centres. The mesenteric glands contained numerous cheesy nodules of the size of a pea. These lesions were shown to be tuberculous by the detection of the bacillus and by guinea pig inoculations.

The cow that supplied the milk was slaughtered, and was found to have extensive pulmonary tuberculosis, but the other organs, including the udder, were healthy.

The second danger from tuberculosis, that which relates to the contagiousness of the disease among cattle, is the side of the question that appeals more especially to the farmer and veterinarian.

An instance illustrating the spread of tuberculosis may be cited from the writer's experience:

A farmer who had conducted a dairy for four years and had never had any disease among his cattle, so far as he was able to discover, purchased a heifer calf, together with some other cattle, in October, 1892.

The heifer was evidently in poor health at the time of purchase and was therefore removed from the farmer's herd, after it had been a member of it for a few days; and "to give it a better chance," it was turned into a passage way in the stable that ran along the front of the cows' heads. Here the heifer was alone, but was able to come in direct contact with the head of every cow in the herd. There was no manger in the passage way, so the calf was fed from the barrow used to carry the food to the cows.

The heifer's appetite was voracious, but it continued to become thinner and weaker, its coat became dry and staring, it suffered with a racking cough, there was an occasional discharge of creamy matter from the nose, and in six weeks from the time of purchase it died. No autopsy was made. Some six weeks thereafter some of the cows commenced to cough; they gradually grew thin and yielded less milk. Early in March a cow died that had been affected

as above for some weeks. Before the last of September nine cows had either died or had been sold while still able to walk away. Some of these cows were opened and examined by a veterinarian and were found to have died of tuberculosis. In September, less than one year after the introduction of the heifer, the herd was tested with tuberculin ; 19 animals reacted and were slaughtered and were found to be tuberculous.

In some instances, as the one quoted, the disease spreads with amazing rapidity through almost the entire herd ; in other cases the progress is gradual and slow, and often a herd has harbored it for years and but a small percentage of the animals become affected.

The study of the predisposing causes of tuberculosis of cattle is an important one, and one that is at present quite incomplete, although a number of undemonstrated theories in explanation of this subject have been advanced.

Among the points that require special study are the influences of the following factors on the predisposition to tuberculosis : Heredity, feeding, stabling, climate, season, breed, productiveness, especially in reference to the dairy cow, and age.

It seems probable that excessive stress has been laid on *some* of the above points, since observations show that continued association with tuberculous animals will lead to infection in a large percentage of cases, notwithstanding the other conditions. But they do, to a certain extent, influence the rapidity of the spread of the disease.

Tuberculosis spreads more rapidly in the Winter, when the cattle are housed, than during the pasturing season. Some personal observations indicate that the construction of the stalls has some influence on the dissemination of the disease, since it appears to spread more rapidly in stables so arranged that the cows can bring their heads in contact with their neighbors' and touch noses, than in stables fitted with solid partitions between the cows' heads, or with box stalls.

That tuberculosis of cattle is rarely inherited is the testimony of all practicing veterinarians, and is clearly shown by the report of the examination of nearly one million calves in the Munich slaughter house from 1878 to 1882, of which but five were tuberculous, while the percentage of tuberculosis in the old cattle slaughtered ranged from 2—11 per cent. But that heredity plays an important part in predisposition and immunity cannot be doubted.

In one herd tested with tuberculin, each member of a family of five cows reacted, and all were found, upon post-mortem examination, to be affected.

Some cows can mingle with consumptive associates for years and remain free from tuberculosis, and their progeny are usually endowed with the same natural defense.

In another herd in which 40 per cent of the cows had tuberculosis, one old cow and her three daughters proved to be free from the disease.

It has not been shown that the influence of the sire is as powerful as that of the dam in conferring predisposition to and immunity from tuberculosis.

(Signed), LEONARD PEARSON.

While it is now generally admitted and proven by experiments quoted that the milk of tuberculous cattle is exceedingly dangerous to man, the question of infection from the meat supply is in dispute. Some experimentors have produced positive results by feeding of the expressed muscle juice of tuberculous animals, but it is feared that the experimentors may not have used proper antiseptic precautions in obtaining the material. On the other hand, any one who is in the habit of visiting our slaughter houses will observe that the butchers are not at all particular about the knives used in dressing or the cloths used in cleaning the carcasses, but will persistently use the same knife and the same cloths indiscriminately on cattle which are reeking with tuberculosis and those which are healthy.

It is pretty generally contended at present that when the flesh of a bullock is not visibly affected, and when there is not general advanced tuberculosis, the meat may be eaten with comparative impunity. This question, however, requires much further study, and is far from being settled.

MEANS OF CONTROLLING AND ERADICATING THE DISEASE.

Under this head, Dr. Pearson further writes as follows:

Meat Inspection.—To protect consumer and determine distribution of disease.

Dairy Inspection.—To protect consumer of milk, and remove tuberculous cows from dairies.

After having determined that tuberculosis is present in a herd, it becomes necessary to separate the healthy from the diseased cattle, and thoroughly disinfect the stable.

In the past, the first of these measures has been a matter of the gravest difficulty, since tuberculosis of cattle is excessively difficult to diagnose, except when advanced, and nearly all the beginning cases escape the most thorough and painstaking physical examination. Various methods of surmounting this obstacle to a perfect division of the herd have been suggested; such as an examination of the bronchial mucus, collected through an incision in the trachea with a sponge on a wire, the inoculation of guinea pigs with the milk, the inoculation of such animals with extirpated lymph glands, etc., but all of these methods are time consuming, difficult and unsatisfactory.

Soon after the publication of Koch's work with tuberculin, this substance was employed on cattle to determine its value as a diagnostic agent. It was found that following the administration of a proper dose, a febrile reaction occurred in tuberculous animals, while no effect was produced in animals free from tuberculosis.

In the first summary of results, collected by Eber in 1891, (Centralblatt für Bacteriologie, 9 Nos. 9 and 10,) it was shown that out of 134 animals (cattle) which reacted to tuberculin and were killed, 85.83 per cent. were tuberculous. Of 113 animals (cattle) which showed no reaction after the injection of tuberculin and were killed, 89.38 per cent. were free from tuberculosis. It will thus be seen that in this summary, published very soon after tuberculin was first used for this purpose, there were 14.18 per cent. of failures in the first instance and 10.62 per cent. in the second. We must remember that these experiments were made by a number of experimentors in different places, some skilled and some bungling, all of the autopsies were not carefully made, and, ABOVE ALL, the question of the proper dose was not then settled, and many of the failures may be attributed to that. The most recent foreign reports are almost uniformly favorable.

In my experience of more than 500 cases, of which about 100 have been slaughtered, I can count but one error in diagnosis; an old cow badly diseased, which did not react after a small dose. All of the other results have been most satisfactory. Every cow that gave a reaction and was killed was shown to have tuberculosis.

By the use of tuberculin then, it is possible to isolate the diseased animals and make sure that those remaining are free from tuberculosis. *If the stable is now disinfected*, and the herd retested after an interval of six months, to find cases that might, by some

almost impossible chance, have escaped the first examination, we shall have freed the herd from tuberculosis, and it only remains to exclude diseased additions to keep clear of the scourge.

An important question that presents itself is: What shall be done with the cows that react? Our previous experience and present knowledge allow but one answer to this question, and it is, destroy them. All animals that react, ignoring the very few possible exceptions, are tuberculous, but it should be remembered that some of them suffer to but a very slight degree.

In some of the animals we may, upon making the autopsy, find nothing but a few tuberculous areas of the size of a pea, and perhaps these are situated in the lymph glands. In such a condition, an animal cannot scatter the tubercle bacilli, and it might be objected that slaughter is unnecessary waste, but how are we to know that the tubercles, which we are sure exist in the body, are not in the lungs, the kidneys, the uterus, the testicles, or even the udder? The most careful and exact physical examination could easily fail to elicit their presence at some stages of their growth.

We know that nearly all cases of tuberculosis in cattle tend to advance, and that a slight depression or illness may lead to the rapid development of a more general tuberculous condition, starting from the lesion which we *know* is present.

The sale of an animal known to have tuberculosis, though ever so slightly, cannot be justified, either morally or legally, and to keep such an animal in a herd is to harbor a foe of unknown strength.

The writer has never seen the least bad results follow the injection of a quantity of tuberculin sufficient to answer the purposes of diagnosis. It is well known that in a tuberculous man an excessive dose of tuberculin will tend to aid in the distribution of the tubercle bacilli in the body, and thus cause milliary tuberculosis and hasten death. That an excessive dose may do the same in tuberculous cattle is shown by an experiment, in which 0.6 c.c. was administered to a yearling Jersey heifer, that was known, from the marked symptoms, to have pulmonary tuberculosis. The temperature was 101.6 degrees. Following the administration of the tuberculin, a febrile reaction to 106.2 degrees F. came on in 9 hours. The temperature remained above 104 degrees F. for 6 days, when the heifer died, and acute milliary tuberculosis of the lungs, peritoneum, kidneys, walls of the uterus, and all of the lymph glands connected with the thoracic and abdominal organs, was found. This result was evidently due to

the large dose, which was six times the normal for an animal of the size of the subject of the experiment.

The normal dose, instead of doing harm, may produce good effects, and I have several cows under observation that gave decided reactions when first tested, clearly indicating the presence of tubercles, but, after receiving three or four injections of tuberculin, the reactions ceased, the general condition of the animals improved, and at present it is impossible to elicit evidence of tuberculosis, either by the physical examination or by the tuberculin test.

August 11th, 1892, a Jersey cow, 5 years old, received 0.25 c.c. tuberculin beneath the skin, and the temperature rose to 2 degrees F. within 12 hours. The cow was in medium condition, had a cough, and her general appearance was a little below the average of the herd.

December 22d, 1892, she received another light dose and reacted $1\frac{3}{5}$ degrees F. within twelve hours. Her condition now improved, she became fatter and her coat became glossy. She was heavy with calf at the time and that may have had some beneficial effect on her general condition.

February 25th, 1893, she calved, and March 1st died of milk fever. An autopsy was made the same day, and the only evidence of tuberculosis was a calcareous deposit as large as a hickory nut in the mediastinal lymph gland, and a hard, fibrous and dry, cheesy area of the size of a large walnut in the tip of the middle lobe of the left lung.

These lesions showed no sign of acute change, the fibrous walls containing the dry, hard, cheesy areas were one-third of an inch thick and exceedingly firm. The calcareous deposit in the mediastinal gland, mixed with dry, cheesy matter, was also surrounded by a very dense fibrous capsule.

Last year, a yearling Jersey bull presented the following symptoms: Condition medium, coat dry, appetite good, temperature 102 degrees F., respiration accelerated, and each accompanied by a grunting sound to be distinctly heard forty feet from the animal; head extended. In the inter-maxillary space were two hard lumps as large as a goose egg, and two similar lumps, not sensitive to pressure, were high up on each side of the larynx. After an injection of tuberculin (0.1 c.c.) a marked reaction took place, followed in two days by slight improvement in the general symptoms. In three months the bull received 1.2 c.c. of tuberculin in six doses, and improved constantly until the breathing was

natural and the enlarged lymphatic glands were reduced to their normal size. The animal was then killed and examined. The thoracic and abdominal organs were normal ; the larynx mucous membrane was normal ; the lymphatic glands, which were felt from without, each contained dry, cheesy masses of the size of a pea, surrounded by dense fibrous membranes, and one of them contained a slight calcareous deposit.

Twelve cows were treated last Spring, each with nine injections of tuberculin, in all about 5 c.c., during a period of fourteen weeks. All had previously reacted to tuberculin and were known to be tuberculous. Nine of the cows ceased to react after two to five injections had been given, but the other three continued to react after each injection. All were killed, and in the nine cows lesions of the greatest variety were found in nearly all of the organs, but all of them—in the lungs, pleura, liver, kidneys, walls of the rumen and peritoneum—were surrounded by fibrous capsules, markedly thicker than are ordinarily found. Three of the nine had but slight lesions, and they were made up almost entirely of dense fibrous tissue, with minute masses of cheesy material at the centres.

The three cows that continued to react showed generalized tuberculosis of both body cavities and affecting, especially, the serous linings of these cavities.

These experiments seem to indicate that tuberculin has a curative action in *some* cases, especially when the disease is slight. Certainly the symptoms frequently improve after the use of tuberculin, and further experiments will be necessary to determine the exact action at the point of disease and the permanency of the relief.

The subject is important enough and the indications that valuable results will be obtained are strong enough to justify the expenditure of a large sum of money on the work. We are indebted to Mr. Jos. E. Gillingham for the financial assistance without which these experiments would have been impossible.

Upon this subject further is the report of Dr. Peters, as follows :

JAMAICA PLAIN, MASS.,
Aug. 10, 1893.

DR. A. W. CLEMENT, Chairman.

Dear Doctor:—I propose, in this brief report to you, to state the manner in which the work of eradicating tuberculosis from cattle in New York State has been systematized. As it is, so far

as I know, the first State Board of Health in this country to actually make a beginning at grappling with this subject in earnest, I think that a short account of the practical working of the law may prove of interest, together with a few words as to its benefit to the community, errors in diagnosis and the like.

Granting that the New York State Board of Health acknowledges the work already done in investigating the danger to human life from the use of the milk from tuberculous cattle demonstrates it to be unfit as an article of food, there is no need of arguing the pros and cons any further, or of giving details of experiments which have been printed over and over again, and repeatedly quoted.

The law passed by the Legislature of 1892 works admirably. The veterinary inspector is amply protected in his duties by being empowered to call upon a deputy sheriff, or sheriffs, for protection in case he is interfered with, and having a penalty attached for the punishment of any person who obstructs him in the discharge of his duties. The owners of cattle are also protected in their rights by being allowed a claim against the State for any animals destroyed, which is as it should be. It may be argued that a tuberculous cow is valueless, and therefore the owner is not entitled to compensation. This is a very small argument to make when a State kills cattle for the public good. The animals are killed for the benefit of the people, and the owner should be paid in full for the value which they represent to a non-professional eye before slaughter.

The law also provides for the disinfection of stables, cars, boats and the like, a wise provision, especially for application to infected stables. In the enforcement of such a law a system of procedure must in time elaborate itself, and finally, as the result of the combined judgment of Dr. Cooper Curtice, Inspector of Cattle for the New York State Board of Health, the President and Secretary of the Board, and the writer, suitable rules and regulations were prescribed by the State Board of Health and a method of work was adopted, which need not be gone into detail in this report, but which may be ascertained by application to the Secretary of the Board.

After the cattle are tagged, and while the inspector is waiting for the order to kill to arrive, the owners of the creatures calls in one or more neighbors familiar with the value of cattle, who appraise their value, and then swear to the truth of the appraisal before a Justice of the Peace, or a Notary Public. The owner of

the animals then writes to the Clerk of the Court of Claims at Albany for instructions for filing his claim against the State, and when he receives his instructions he forwards his application for remuneration, with the certificate that the cattle were killed, and the sworn appraisal to the Clerk of the Court of Claims, and when the Court sits it awards such a sum for the loss of the farmer's stock as seems to it just and proper.

The Inspector of the State Board of Health has nothing to do with appraising the value of any animals killed. It is his duty to see that diseased stock is destroyed, but it is none of his business what it may be worth.

Near New York City the animals were given to a renderer to compensate him for sending men to take them to his rendering works, slaughtering, and helping to make the autopsies. In more rural districts no difficulty was found in finding a man willing to kill a cow and cut her up for her hide. In the former case the carcasses were converted into fertilizer ; in the latter the meat was rendered unsaleable by sprinkling the cadaver with kerosene oil. (An idea of Dr. R. A. McLean's, I believe.) No attempt was made to convert any of the animals into beef, as after they are tagged they become the property of the State of New York, and it was thought that in work of this kind it would not do for the State to attempt to save any money, even by selling the flesh of actually healthy animals killed on suspicion, as it might give rise to unfavorable comments.

The system adopted works admirably in actual practice, and may well serve as a model for other States to copy from in attempts to secure legislation for the suppression of bovine tuberculosis. Where a State Court of Claims does not exist, other arrangements for recompensing owners for cattle destroyed would have to be made, such as having the Legislature make a special appropriation for cattle slaughtered, or something of that kind. Five thousand dollars does not seem a large sum for beginning such an undertaking as provided for in the bill, but it is wonderful how much can be accomplished with such a sum, as fully 20,000 cattle were examined, to say nothing of 125 or 150 autopsies that had to be made. Another Winter a larger sum will be available to continue the good work so well begun.

But little opposition was met with in carrying on the inspection and tagging, and the services of a deputy sheriff were not required more than three or four times, but the work done so far has been chiefly in Orange and Westchester Counties, where the

United States Bureau of Animal Industry was engaged in stamping out contagious pleuro-pneumonia a few years ago, and the farmers and milkmen in these localities were used to having their cattle examined and slaughtered, whether they liked it or not. In a district where there had never been any inspection of cattle and destruction of the diseased, it is possible that more opposition might be met with.

The work is of great value in many ways. It shows—

First. That in a typical dairy farming community, like Orange County, bovine tuberculosis is not as prevalent as many veterinarians believe, there having been only 35 cows killed out of about 10,000 examined; that is, .035 per cent. were found to be diseased under ordinary means of inspection.

Second. Among hardy grade cattle, with a Holstein, Short Horn or Ayrshire cross, kept under ordinary farm conditions, tuberculosis is not as infectious as it is usually believed to be. In every instance but two, only one or two animals were found to be diseased in herds numbering, as a rule, anywhere from twenty to fifty head. In two instances, more than two were found to be diseased in a herd; in one case three were killed; in another five were slaughtered. In Westchester County, out of about 10,000 examined, in the neighborhood of 85 head were slaughtered, but there were more errors in diagnosis made here than in Orange County; a number of mistakes, six or eight perhaps, having been made. In Orange County, out of the 35 cows killed, only one was not tuberculous, and the diagnosis in her case was not positive, as before she was killed it was suspected that she might be suffering from pneumonia, which proved to be the case.

The value of dairy inspection was better demonstrated in Westchester County, as here several herds were found badly infected with tuberculosis. In one instance it was found necessary to destroy an entire herd, not counting a few that died before final arrangements were made for killing the remainder (eleven head having been killed in December); 52 animals all told were slaughtered on two different occasions, one bull, tuberculous, 39 cows, all more or less tuberculous except one, four two-year-olds and eight yearling heifers, 50 per cent. of them being tuberculous. This herd had formerly consisted of fine Jerseys, but a number of so-called natives had been bought during the past few years to take the place of cows that died. The milk from this farm was being sold in New York City as very fine Jersey milk, at the high price of 12 cents a quart.

In another lot of cattle, consisting of 24 head, the milk being peddled in the neighborhood where they were kept, six cows were killed and found to be tuberculous, a total of 25 per cent. In another local milkman's herd, consisting of 15 animals, five were slaughtered and proved to be tuberculous by post-mortem examination, making 33⅓ per cent. of the number on the farm.

The other animals killed in Westchester County were all scattering cases, only one, two or three from a farm, and a few of these which were killed on suspicion proved to be errors in diagnosis. Possible errors of diagnosis were found to be chronic bronchitis, and cases convalescing from catarrhal pneumonia, or capillary bronchitis. Bronchial troubles among cattle were enzootic in Westchester County during the latter part of the Winter and early Spring of the present year, which made the examination of the animals extremely difficult. In many instances it was necessary to re-inspect suspicious cases once, or even twice, at intervals of two or three weeks, before it could be decided whether the trouble was bronchitis or tuberculosis. One animal killed as suspicious, and found to be suffering from chronic bronchitis in one lung, was not destroyed until two months after she was first inspected, yet the piping sound in the lung was as constant at the end of that time as on the first day she was examined.

One case killed on suspicion of being phthisical was found to have a small bit of a brier bush of some kind (apparently either from a raspberry or blackberry bush) in the upper posterior part of the right lung, near the outer border. This bit of stick was between one inch and two inches long, and had been taken into the bronchi with the points of two or three thorns on it directed toward the cow's head, acting as barbs, and preventing it from working in any direction except farther and farther into the lung. It had evidently been in the location where found for some time, as it was surrounded with a calcareous deposit. At the time it was first carried down the trachea, and for some time afterward, it must have caused a great deal of irritation along the course it took.

Another cow was killed as a "roarer," but upon post-mortem examination no tuberculous lymphatic glands could be found around the larynx, pharynx, or in the media-stinum. The trachea was then removed, and it was found to have several of its rings fractured at a point half way between the larynx and thorax, making it oval instead of round, and causing a roaring in respira-

tion which, after any exertion on her part, could be heard for about half a mile across the fields. It is very possible that this accident to the trachea may have been caused in an attempt at some time to smash an apple, turnip, or some similar body in the œsophagus, between a block of wood and a mallet.

Tuberculin as a diagnostic agent was not extensively used, two herds only having been tested with it, one in Westchester County in March, on the herd where all the animals were killed; the other near Poughkeepsie, Dutchess County, in May, the animals being killed early in June. In both herds the results were quite satisfactory, but the latter one was much the better to use for the experiment, as it contained a few healthy creatures, and their general condition was better than in the first instance when it was tried. The Poughkeepsie herd consisted of two bulls and thirty-one cows and heifers, which were tested with tuberculin, besides which were three yearling heifers which were not incoulated, and two young calves. Of the thirty-three animals, all but four cows reacted to the tuberculin, and one was unsatisfactory, as she was not well and had a temperature of 106 degrees at the time of the inoculation. Hence twenty-eight animals out of thirty-three may be looked upon as tuberculous according to tuberculin. A physical examination of this herd indicates one cow with general tuberculosis, one cow and two heifers (one of them a yearling not tested with tuberculin) "roarers" from enlarged tuberculous glands back of the pharynx, and three cows suspicious, because of their coughing and having a bad history connected with the farm.

All the animals that reacted to the tuberculin were killed (and also the heifer that was a roarer, but not tested), and found, in every instance, to be more or less tuberculous. One cow that did not react was killed and found to be perfectly healthy.

The question in this trial seems to be: Is tuberculin too fine a diagnostic agent for use in the examination of dairy herds, unless used as an assistance to our other powers of observation?

One cow had only three small nodules in the liver, another a small cheesy posterior-pharyngeal gland, two or three others tuberculous posterior mediastinal glands. Now the question is; Are such animals any danger to other cattle or to the public health?

No, not in that condition. But, on the other hand, no one can tell when the disease may not become more active, and the inspector may leave behind him an animal as harmless to-day which a few months hence may be in a condition to be a greater danger to the well being of the community.

The tuberculin used in the Poughkeepsie test came from the Bureau of Animal Industry Laboratory, at Washington. I was not present when the tests were made in May, but secured the orders to kill from the Secretary of the New York State Board of Health, and took charge of the slaughtering and autopsies about three weeks later, in June, on which occasion I was assisted by Dr. John Faust, his sons, Dr. Otto Faust, and William Faust, a medical student, and Dr. Norgaard, of the United States Bureau of Animal Industry. These four gentlemen conducted the tuberculin tests about the middle of May.

Although I have always been a skeptic regarding the utility of tuberculin, the experience I have recently had with it has changed my views a great deal, and I now believe that it may be a very valuable agent if properly used.

In suspicious cases, where doubt is felt as to whether an animal is tuberculous or not, it is well worthy of a trial; and in herds where a number of cases of tuberculosis are found, I believe it to be advisable to test the entire herd with it. I do not, however, believe it necessary or practicable to go to every farm in the country and test every single cow to be found with tuberculin, but if a herd be inspected in the ordinary way and found to be healthy, I consider that sufficient.

In a breeding herd no doubt it might be advisable to kill every animal that reacted to tuberculin, no matter what its apparent condition of health might be.

I am yours, very sincerely,

AUSTIN PETERS, M.R.C.V.S.,

Chief Inspector of Cattle for the New York State Board of Health.

To summarize this report, your committee concludes that tuberculosis is a world-wide disease, affecting, in all probability, all classes of animals—due to a specific micro-organism known as the tubercle bacillus. That the disease causes great losses in our domesticated animals, and millions of deaths annually in the human family—that the disease may be transmitted from the lower animals to man, through the milk, and under certain circumstances, through the flesh used as food—that the diagnosis is now made possible in all cases by the use of tuberculin.

That the different City and State Boards of Health should have a veterinarian as a member of the board, and that these officers should be in direct and constant correspondence with the

proper officials of the Central Government, who in their turn should have final jurisdiction.

That while it may not be practicable, at present, to undertake the complete eradication of this disease, each State should, at least, institute a thorough examination of the herds to determine its prevalence; the question of a radical attempt to stamp it out should be agitated; owners of cattle should be apprised of its dangers, all tuberculous cows should be removed from dairies, and all meat should be subjected to a veterinary examination at the time of slaughter.

MILLET DISEASE.

By T. D. Hinebauch, M.S., V.S.

HORSE HARRY.—(Concluded from page 322.)

Date.	Nitrogen.	Total Solids.	Ash.
September 13	1.55	9.50	2.05
" 17	1.58	11.65	2.90
" 21	1.16	10.08	1.88
" 25	.96	5.58	1.90
October 4	1.35	7.48	

Carrying out the percentages, basing the calculations on the amount of urine collected, we find the following:

Date.	Nitrogen.	Total Solids.	Ash.	Amt. of Urine.
	adv.			
September 13	4.4 oz.	1 lb. 11 oz.	6 oz.	17 lb. 14 oz.
" 17	3.3 oz.	1 lb. 9.1 oz.	5.8 oz.	13 lb. 8 oz.
" 21	3.9 oz.	2 lb. 1.8 oz.	6 3 oz.	21 lb. 0 oz.
" 25	4.1 oz.	1 lb. 7.7 oz.	8.1 oz.	26 lb. 11 oz.
October 4	3.8 oz.	1 lb. 5.4 oz.		17 lb. 14 oz.

We thus see that the amount of the different ingredients vary from day to day, and are not as might be supposed nearly constant. In other words, if the amount of urine increases the total increase is not alone of its water, but also of the other constituents as well.

If we take September 13th and October 4th, when the amount of urine was the same, and compare the total amount of nitrogen, we get a difference of .6 oz.

Yet we find that the proportions of nitrogen to total solids are the same, thus: 4.4 oz : 27 oz.=3.8 oz : 21¼ oz.

However, it is not to be relied upon, as the data are insufficient on which to base a calculation with any degree of accuracy.

OSTEO-POROSIS.*

By Dr. Claude D. Morris.

In the presentation of this subject, I bring before you in a manner not at all satisfactory to myself, and I fear as will be viewed by you at the conclusion, a lame discussion on a disease not very prevalent in this country to any extent in an aggravated form; and yet which I believe is prevalent to some extent in certain localities in a mild form, and when existing in degree sufficient to warrant diagnosis. The baneful effects of the disease have made such inroads upon the animal economy as to baffle the skill and energy of the veterinarian to the extent, that Osteo-porosis is catalogued as one of the incurable diseases affecting the lower animals. However, I cannot believe it is a disease whose only sequel should be ultimate dissolution.

The literature bearing on this disease is not abundant. In 1860 Professor Varnell wrote an interesting article on Osteo-porosis, and it is claimed that Varnell was the first to describe the disease. Later, his article appeared in the *Veterinarian* of that year. About 1870 Sir James Paget relates before the Pathological Society, London, his experience with a disease termed by him as Ostitis deformans, and from the description he gives, stating symptoms, post mortem appearances, &c., I think there is no doubt as to the identity of the disease previously described by Varnell. Again, in Dr. Lippincott's report of 1875-6, Phil., relates the history of a disease under the head of "Ostitis deformans," which bears a striking resemblance to that of Osteo-porosis. Also Lane, in Guy's Hospital Report, Treasurer of the Pathological Society, London, 1886, describes at length Osteo-porosis, and I will here quote one paragraph from his very interesting and valuable paper in that report, before discussing the disease, from American pathology. Lane holds that the thickening of the skull is a process of repair, and not a direct result of the disease, and says that in Mollitis ossium the thickening of the skull is dependent upon an endosteal, and later upon a periosteal, deposit of decalcified lamellæ of fibrous tissue, this being not a direct product of the condition, but an effort on the part of the organism to oppose and limit the baneful influences of the process of decalcification in so far as it affects the cranial vault. He applied the same argument to the analogous condition of the skull present in Ostitis deformans, rickets, and congenital syphilis.

* Read before the Fourth Semi-Annual Meeting of the New York State Veterinary Medical Society.

What is Osteo-porosis, as understood on the American Continent? It is a non-inflammatory disease of bone, characterized by defective action in one or more of the joints, affecting one or two of the limbs in an alternate manner, a much tucked up condition of the abdomen, an arched spinal column, a straightening of the limbs, and as the disease progresses an enlargement of the facial and sub-maxillary bones, with defective mastication, accompanied with tenderness upon manipulating the bones of the face. During the entire stage of the disease the pulse remains about normal, with slight variation of temperature, obscure pains, metastatic in character. resembling that of rheumatism.

I beg to give you a brief history of this disease, as was manifest in these specimens before us. On the 14th of last February I was called to examine a two-year-old stallion suffering with lameness in the right fore extremity. Examination revealed tenderness and some degree of heat in the heel. As the animal was being conditioned for fast work, I thought it not at all strange under the circumstances that he should bruise the heel, which seemed a valid cause for his lameness. Therefore I diagnosed the trouble, Navicular Arthritis. On the 10th of March I was called again. The lameness had then left the fore extremity, and was at that time very pronounced in the left hip. It was at this time that I began to mistrust the impending trouble, whereupon a thorough examination was made which proved beyond doubt my suspicion.

This case was watched daily from this time till May 25th, when it was deemed as only humane to end the sufferings of the animal. During this period the disease presented the following symptoms: A constant degree of lameness in some one or more of the extremities at the same time; the peculiarity of which was, when lame in two limbs, at the same time, it would be that of the hind and fore limbs of the opposite sides. The greatest degree of lameness existing was in the left hind leg, which became straight, as the disease progressed, to such extent that a straight line drawn from the trochanter major externus to the os pedis would touch the entire length of all the long bones of the leg. A general atrophy of the muscles of the limbs, and at times an inability to rise without assistance. Appetite good, but towards the last there was a disinclination to masticate ordinary foods, gruels being administered instead; the bowels remaining normal throughout; urine natural in quantity and color. Post mortem examination presented a most interesting revelation. I will relate a few of the

more prominent lesions. The animal was bled for the purpose of dissection. The muscles of the legs were paler than natural, and maculate. In disarticulating the limbs from the trunk, and especially the bones of each limb one from the other, the interior of the joints presented a contrast. The articular cartilage was of a purplish hue, much thinner than natural, and in some instances entirely lost, leaving the margin of the articulation at that point quite exposed.

In others the articular cartilage was of natural thickness, but easily detached from the bone. In these the synovial fluid was darker in color, and in some instances streaked with blood. The synovial membrane was much thickened at the parts most vascular, then again these same structures in other joints were much paler than natural. The periosteal covering of the long bones was quite vascular and easily detached, especially the bones of the skull. Some of the flat and irregular bones were soft, and could be readily cut with the knife; one very noticeable feature being that all ligamentous and tendinous attachments were easily separated, bringing portions of bone as they were torn loose.

These attachments were much discolored, indicating that local inflammation, or extravasation of blood, had taken place. I am of opinion that there must have existed considerable inflammation in the soft structures affected, and was sufficient cause for the manifestations of lameness which existed in certain articulations.

Another post mortem characteristic is that the weight of the bones is greatly diminished, apparently one-third of their weight being lost. The increased size of the medullary canal is well marked in the long bones; and what seems to be a complete breaking down of the cancellated structure is visible throughout. The same degree of destruction exists in the compact tissue. The haversian canals, the lacunæ and canaliculi appear as homogeneous.

Another noticeable feature of this disease presented itself while cleaning the bones; perhaps due to their extreme softness. The different processes (epiphyses) were detached from the bone. The application of the slightest force upon a tendon or ligament was sufficient to effect their removal. Contrasting a healthy bone with one affected with this disease, we observe that at the ends of the long and flat bones the disease has permeated the compact as well the cancellated structure. The increased size of the haversian canals is very patent, as are the foramina for the passage of blood vessels; the same existing in the periosteal membrane, causing the

bones at the extremities to assume a honeycombed appearance. Thus I might proceed at length to narrate post mortem lesions, believing, however, that a few briefly stated facts will prove more interesting than a paper treating at length on all the details.

From all sources obtainable in the literature treating on Osteo porosis, and from limited experience, the causes and morbid development of the disease is still enshrouded in more or less mystery. However, I am forced to believe from crude reasoning that osteo-porosis consists in a degeneration of the normal development of bone; the process being assisted primarily by decalcification, a gradual absorption of the calcareous materials, a diminution in the function to assimilate bone producing foods, and latterly, an unnatural development of the vascular and fibrous tissues of bone, devoid of the true elements of osseous and cartilaginous structures. I base this reasoning on one fact, that osteo-porosis is a disease of development, which only occurs during the growth of the animal, there being (so far as I can learn) no record of the disease in the adult animal.

If osteo-porosis is a disease whose incipiency originates in faulty digestion, which must necessarily entail a deranged absorpant system, thus attenuating the functional activity of assimilation, would it be unreasonable to suppose that the osseous structures ought to suffer quite as much as any other structure or vital organ of the economy? If food and oxygen are the source of all physical energies when properly appropriated in their relation to the maintenance of animal life in obedience to Nature's divine laws, there is then but one expectancy. It seems to me that therein lies the panacea for all physical ills.

As I view the azure and crimson twilight in this the evening of the nineteenth century in the great work wrought in medical science, preparatory to taking her place in the front rank at the dawn of the twentieth century, as the Science of Sciences, in its benefactions to animal existence high or low, I cannot forbear the belief that within the next few decades disease must succumb in the conquest now waging as between the mysteries of insidious disease, and the knowledge to which the medical science shall then have attained. When the declaration, so oft repeated by physicians, which is but a warning to the "animal" and an acknowledgment of human weakness. There now remains no further aid that man can afford. This sentence shall then give place to a broader, more intelligent, and of complete mastery over disease, "Go live in peace your allotted time."

Dr. Morris added.—With this paper I have a few specimens which I thought might prove interesting. In the first place, you will notice in my paper I stated it was early in March when I saw the case first, and the horse had not been lame for about ten days. Perhaps the first or second day of March was the first that the animal was noticed going lame. This colt could go out and trot in better than thirty; he was a little past two years old, and he was bred in north-east Pennsylvania, sold to some stock people down in Lexington, Ky., brought back to New York last January, and sold there at a very fair price. He was taken to a stock farm in the southern part of Dutchess County, and on the 15th day of May we destroyed the animal, and in that short time the disease, which is so apparent here in this skull, was fully developed. I have since seen several specimens of the disease, but I consider that one as good as I have seen. In going over the bones, and especially at the femur, a very noticeable feature is its extreme light weight, which is so marked that by simply taking the bone in your hand, without seeing it, you would not believe that it was a bone; and the epiphyses of the bones, the different developments for the attachments of muscles and ligaments, you can see that as the muscles and ligaments were torn loose the portions of the bone have gone with it, breaking off, especially where the glutæus muscles were attached, on this projection, easily gave way as we tried to remove them; and also after the bone had been cleaned and laid out in the sun to dry, the extremities dropped off very easily; and other portions of the skeleton, some parts which have not been out in the sun at all, are seemingly going the same way; all the portions are coming off very readily indeed. It seems to be one of the characteristics of the disease that the bone absolutely disintegrates, and that all the parts which have been homogeneous and in perfect contact in the healthy bone, give way very readily. Then when we examine the interior of the bone we notice again the ravages of the disease. The cancellated structure has become entirely broken down, and in examining the compact tissues with the naked eye you can very readily see the disintegration, particularly of the Haversian canals, and there is but very little solid, compact tissue about the bone; and this was in an animal, you must remember, that was suffering only 90 days with the disease; and it seems to me that everything must have been very opportune for the disease to permit of its producing the ravages here manifested in an animal which 90 days prior was apparently in perfect health. We find again that the disease permeated not only all parts of the bony structure, but even the teeth were not exempt, as the crusta petrosa show manifestations of the disease as much as any other bone, or any other part of any bone, and it is especially noticeable in the alveolar processes, that it comes right out easily, spongy in nature, very light; the specific gravity is comparatively nothing, whereas in its normal state it has a considerable specific gravity, and is quite intact and homogeneous and solid, while in this instance it is easily detached and very light in weight.

The Chair, Dr. Wende.—Dr. Morris' very interesting paper on this very important subject is now open for discussion. If any of the members have similar cases we should like to hear from them.

I have seen quite a number of these cases. In 1889 I met with five in the city here. Four out of the five were horses that were brought here from the West. One was a horse that was raised right out at the north end of the town here, and where we have the finest limestone quarries in this part of the State. He was raised by a party that owns the quarries, and raised right on that limestone. He was ailing to my knowledge for about a year. My attention would be called to him and I would find him lame in one leg or another. He would be laid up and rested for about a

week, when he would do about a week's work again, and then have to be laid up again Finally, I think in May, 1889, I had a call out there, and one of the men told me to look at the colt again. He was five years old then. I had not seen him probably in six weeks or two months. At this time I recognized the disease by the enlargement in his face. I ran a horse-shoe nail right into the side of his face. The skin was the hardest part to puncture. I told the man what I thought the disease was, and that I thought him incurable. About a month afterwards I was called out again. I found the horse extremely lame. Another veterinary surgeon had been called in, and he advised the bathing of the limbs for a week, two hours each day, at the end of which time he would come out and put on a blister. Well, I told them to let the man proceed ; that I didn't believe it would do any good. About a week or ten days afterwards I was called out there again. There lay the colt. They couldn't make him get up. They asked me to come out and sling him. They had always been good customers of mine, so I went out to sling him up. When I got there sure enough the other Vet. had blistered the horse. They told me that about two hours after the blister had been applied the horse lay down and never got up afterward. I used to be out there two or three times a day, or an assistant, and we raised the horse up. He would not touch a foot to the ground. I think we did that four or five days, until he commenced to get bed sore, when they allowed me to destroy him. I have the skull of that horse at my infirmary.

Then, I think in January, 1891, I had a horse in my place, a boarder, the only boarder I had, and one that I boarded almost three years. This horse was five years old, and Kentucky bred. He was taken sick with influenza. I treated him, and got him over it all right apparently, but seemed to have a sequel that I diagnosed as rheumatism. He would be lame in one leg and then the other. All the treatment that I could give him wouldn't do him any good. If I got him straightened up so that he could walk fairly well, and the man take him out and drive him about an hour, which probably would happen once a week, then he would be worse again. I kept him there until the latter part of March. I went off to Toronto to the examinations, and was gone about a week. When I returned and saw the horse, I recognized at once that his face was enlarging, and tested his face with a horse shoe nail. You could run it into his face without any pain at all, and strike the nail with your finger so that it would "ding," as the stableman said. Well, having treated that horse then for nearly three months for rheumatism, I didn't dare go back on my first diagnosis. Before I went away the owner had been ready to sell him, so now I advised that he sell him if he got a chance, which he did. He sold him to a homeopathic physician in town here, who said he could cure him. I felt satisfied that he could not. At any rate he took the horse, and took him to another stable to board, in which the horses are kept on the second floor. He gave him his pellets, and sure enough the horse commenced to improve, and is being driven on the streets here to-day. The doctor attributes the cure, of course, to the use of his homeopathic pellets, while I attribute it to the surroundings. He never knew but that the horse was suffering from rheumatism. I never told him that I had changed my diagnosis in the case.

Dr. Sutterby.—Had his face returned to its normal condition?

Dr. Wende.—His face is somewhat enlarged yet, but I do not think it is so much enlarged as it was at the time he left my stable.

Dr. Sutterby.—You haven't had an opportunity to put a nail into it to see whether it would "ding"?

Dr. Wende.—I have not—well, I have had the opportunity, but I wouldn't

try it for fear I might give myself away. This horse, also, gradually seemed to lose appetite or power of mastication, and he was very thin when he left my stable. He certainly eats all right now, and is in good condition.

Dr. Morris.—You say that these horses that you spoke of first, out here, were on a limestone soil ?

Dr. Wende.—One horse, the five-year-old horse, was raised in a barn that stands right on the limestone, and has all limestone surroundings.

Dr. Morris.—The drinking water undoubtedly ran through lime water ?

Dr. Wende.—Yes ; it was all natural water then ; they had no city water at that time ; they have it now.

Dr. Morris.—I know that one of the causes of the disease—when you see it in that form, it shows a want of lime ; the calcareous materials are wanting entirely ; it is one of the elements which go to make up a bony constituent, and that is just what it is deficient in.

Dr. Sutterby.—The hard part of bone?

Dr. Morris.—Yes, the lime, or earthy salts, which go to make up the bone ; and that would be one of the recommendations that I would suggest, that the horse be put on a diet—or put in a section where he would be benefited by receiving more or less of just those very elements, what would seem to be deficient.

Dr. Wende.—This was right across the road from the largest quarries we have in the western part of this State, and the quarries there are pure limestone, thirty feet deep at least. I would also say that all these horses that I have noticed with the disease have been kept in stables with generally a plank floor, but the floor resting down on the ground with no ventilation under it.

Dr. Sutterby.—And effete matter had accumulated for years ?

Dr. Wende.—With the exception of my stable. My stable is well ventilated, and there is ventilation under the stable.

Dr. Sutterby.—Well drained ?

Dr. Wende.—Well drained, every way. This horse was brought here from Kentucky, I think five or six months before he was taken down with the influenza, and probably the other disease existed in his system to a certain extent before it developed at my place ; and then, too, during the winter he was at my place the snow was very deep, and there certainly was no ventilation through under the barn then. I would like to ask Dr. Hoskins whether they have had any like experience in Philadelphia.

Dr. Hoskins, of Philadelphia.—I might say, Mr. President, that the disease is quite prevalent in our neighborhood. It is not the exception by any means. We rather feel that it is one of the current diseases that we are dealing with there right along. I do not know that our location has anything specially to do with it. It is also quite well known that among Shetland ponies it is extremely common, and they are never sheltered at all—often assuming an enzootic form among them, and in certain seasons, as if the forage at that particular season lacked the essential ingredients for building up the bony structures of the body. I have known the same thing to occur on a farm, within about twenty miles of Philadelphia, among a large number of running colts, assuming an enzootic form in a particular season. One season I think there were about thirty cases of it, there being only about sixty in number of the colts altogether, and it was attributed to the fact that the season, either from excessive dryness or some other peculiar atmospheric condition, the forage of that season did not contain the necessary constituents for building up the bony structures. Among running stock it is quite common, and in the neighbor-

hood of the running tracks, close to Philadelphia, there are many cases of it. I have seen no conditions under which it would not develop. I have, like Dr. Wende, thought that the board floors were conducive to its development. While Dr. Morris has called it a non-inflammatory disease, I have seen it ushered in by all the evidences of inflammation that one would want—swelling of the bridge of the nose, heat, tenderness, and all the essentials of an inflammatory action. I have seen the same thing have its origin in joints, presenting all those same symptoms of heat, swelling, tenderness, and evidence of an undue amount of blood circulating in the parts. And I think it is one of the diseases in which there is no form of lameness that it will not assume; and it is, I think, the one disease above all others that I would be very frank in saying I have made more errors of diagnosis in than in any other direction. Looking upon it as a sprain, or an injury, I have, some months afterward, been called back to find the same lameness in probably another limb, only to recognize that it was of the character of osteo-porosis. We have found that the lime water treatment is a desirable treatment, and you have present with you here to-day one of your new members, who witnessed a remarkable recovery under the lime water treatment, and I hope he will take the floor and tell you about it. It was of interest to us all in eastern Pennsylvania, and I think would be equally interesting to you. I do not feel that we understand the disease very thoroughly, but the best treatment I have found for it is to turn them into grass; take them off all grain and all hard food and turn them to grass Under that treatment I have had a number of recoveries, both in ponies and in mature horses; but from anything in the line of therapeutics I have had, with the exception of lime water, no results that would warrant the continuance of the plan of treatment adopted. I have seen the application of blisters over the parts where it had started check it, and seem to hold up for a time the progress of the disease at that particular point. It has been noticed so far as the influence of lime countries is concerned, that the disease seems to prevail in lime districts to as great an extent almost as in other sections; and in sections of country where limestone does not prevail they do not seem to have any more of it than they do in a limestone country; but there does seem to be a very great factor in the atmospheric conditions that prepare the forage for horses; and in certain seasons when we feed the oats and the food of the preceding one, we find a much larger number of cases of osteo-porosis than in years before, which would point very strongly to the likelihood of the food being a very large factor, when from any cause it lacks the essential materials for building up the osseous structures.

Dr Morris.—I would like to ask Dr. Hoskins what he bases his reasons on that osteo-porosis is an inflammatory disease? You have taken the temperature in those cases I would infer, and the temperature indicated that it must be of an inflammatory nature, or that the heat, locally, was what you drew your conclusions from.

Dr. Hoskins.—I draw it solely from the local lesions. As has been well said, by the writer of the paper to-day, the pulse is rarely ever disturbed, either in frequency or in number, but you will find all the local lesions of an inflammation in many instances—not in all. I think though that so many of them start along the spinal column—at least so many that I see—along about the first lumbar vertebra or the last dorsal vertebra, that the thickness of the muscles and the other tissues surrounding the part make it impossible to detect the heat, the tenderness and the soreness; and one of the earliest symptoms that I have noticed in a great number of cases is, that when you pandiculate them they show a great tenderness, and show

the tenderness when you pandiculate over where the saddle rests quite as quickly as back, where they usually yield to pressure. As a rule, when you get beyond the lumbar vertebrae, going to the anterior portion of the horse, they do not yield on pressure there, but they do yield very frequently in osteo-porosis, and I would like to state that one of our veterinarians in Pennsylvania claims that he can diagnose the disease if there are any lesions of the head whatever, though not discernible to the eye, by listening to that horse chewing grain, that he invariably detects a hollow sound when he is chewing his grain ; that he will make a diagnosis from that and risk the future to prove the correctness of it. I have been waiting for opportunities to test that myself, but have not as yet had those cases that would give me the chance to do it. Most of the cases I have seen have been either of long standing, that have come under my notice when they were beyond the necessity of resorting to any obscure method of diagnosis, the lesions presentable to the eye being so conclusive that it was unnecessary.

Dr. Morris.—How old were the oldest animals that came under your notice that were affected ?

Dr. Hoskins.—I rarely ever see one beyond the age of eight, and I have seen them as young as six months.

Dr. Morris.—As I stated in the paper, the literature bearing on the subject is so meagre that it was very difficult for me to find histories of instances, although in looking over the American Veterinary Journals I found one instance of a paper, by a gentleman in the State of Pennsylvania, stating that in one stable, I think, half a dozen or eight cases occurred, and he spoke of it as being a sort of an epidemic in that stable, and he gave a few reasons in support of that view, whereas on the other hand, speaking of the inflammatory character of it, I based my conclusions more upon history than upon experience, especially the Transactions of the Pathological Society of London, from papers that were submitted there on that disease, which was diagnosed more as ostitis deformans, but which undoubtedly is one and the same disease. They say there that it is a non-inflammatory disease, and the reason why they say so is that the clinical thermometer is the true test of an inflammatory disease. Now, if you find inflammation locally, and it does not raise the temperature constitutionally, then we can say we have an inflammatory disease. For instance, we may hurt a part, we may bruise a part, break a limb—we have local inflammation, but have we an inflammatory disease? It is merely a matter of discretion, of how different men agree, as to what inflammatory disease is, whether one constitutionally speaking or one locally speaking. Inasmuch as the disease affects the whole system—every bone, I believe, is affected in a well-developed case of osteo-porosis—inasmuch as the whole system is affected and the clinical thermometer does not indicate a rise of temperature over one-half degree—that was my experience—and then I was led to agree with the former men on the subject, that it was practically a non-inflammatory disease. Still, that may be an error.

Dr. Hoskins.—It may, Mr. President, be a non-inflammatory disease, but certainly when you get those cases with the disease showing itself along the spinal column, and with that thickening on the inner surface of the canal, you will get a rise in temperature, 102, 103, 104. Now, whether that could be directly attributed to the changes or alterations in the bone, or whether it is rather due to the changes in the bone producing other changes, of course is open for question. Now, I don't quite agree with the Doctor wholly as to the statement that all the bones are affected, because I have witnessed some three cases where the lesions were confined entirely to the head, and in each one there was a complete recovery so far as usefulness is

concerned ; and I know of one horse that was recently destroyed for another disease that had osteo-porosis of the head for a period of eight years and never missed a day's work from it—never missed a day's work. For five years he was under my own observation, and I could trace him back three years when the head was in the same shape. He was destroyed a few months ago for another cause not connected with osteo-porosis. I have his head, which I secured, and it is a fine specimen of osteo-porosis, the horse being about thirteen years of age. I know of the same in a Shetland pony, where I advised his being turned out for a period of six months. There was another case where there had been some three Shetland ponies on the same farm, all afflicted ; two of them had been destroyed by other veterinarians prior to my being called there for advice on the third one. I advised his being turned out, and was blessed with the good fortune to see him make a good recovery, and he has been driven by the children who own him for the last three years, the lesions entirely confined to the head. And there has been in that case a return of the head to almost its normal condition. An expert, or one who had seen the case before, would detect still a slight enlargement over the superior nasal bone, but I think the average judge would say, " Well, he is probably fuller at that point than most cases are." Now, certainly without any evidence of any breaking down, any lameness, or any loss of power in any other part of the body, the lesions being confined entirely to the head, we could hardly say that all the bones were affected. Recent writers have taken the position—and some of the strongest in veterinary literature—that rachitis and osteo-porosis are identical.

Dr Wende.—Speaking of all the bones being affected, I have one very fine specimen, in fact the finest I have of osteo-porosis, where there is presented on the inferior maxilla a well-defined line of demarcation, if I may so term it, showing where the disease existed and where it did not exist. It only existed on about two-thirds of the inferior maxilla, on both sides, running back about two-thirds of the way and then ceased. It was very well developed too where it did exist. It is the only specimen of the kind that I ever saw marked like that.

(To Dr. Morris).—Did you notice anything of that kind on your specimen ?

Dr. Morris.—In this case of mine I examined all the bones of the skeleton—took particular pains to examine them all—and I have failed to find a bone that does not show the ravages of the disease. The scapula of the right fore-limb was as light as a fan, to hold it in your hand, and I supposed was in the box which I brought here, but find that the young man who put them up for me neglected to put in the scapula. I do not mean to say that no case could exist wherein all the bones were not affected. I can readily see how a horse of stronger resistance could throw off the disease and limit its baneful influence ; but here was an instance where the structure all gave way, the animal being only a little over two years old. Possibly the older the animal becomes the greater would be his resistance to the disease and his power to limit its effect. I can easily see how that may be accomplished ; but in a young animal like this, where the disease was well developed and well under way, lame in all four extremities, the arched back, the curved cervicle, and sore from head to foot—I think everything then is pretty nearly affected. However, this patient was diseased from beginning to end ; I cannot exempt any part. I should like to hear from the gentleman that Dr. Hoskins speaks of about this lime-water treatment.

Dr. Willganz.—I am the man that Dr. Hoskins referred to. I was a student at the University of Pennsylvania at the time that this animal was sent there. The case was placed in my charge. It was sent from Gloucester, N. J.—from the race

track, having been there for about six months, worked every day, and said by a doctor down there to have been at one time lame all over. Shortly afterward they called for our ambulance—probably two weeks afterward—and said that the horse had broken down. I went over with the wagon for the horse. I recognized a tenderness at the fetlock, a good deal of heat ; in fact, there was pain on manipulation. The animal could hardly walk into the ambulance. We took him back to Philadelphia and led him into a box stall. The next morning when we went through the hospital, about five o'clock, he was standing. At seven o'clock he was down. His temperature was taken, and there was an elevation. We got slings under the animal and raised him, leaving him that way for about a day. Then we concluded to remove the slings, and he stood for probably three days. Then he went down again. This was the first time I had ever heard of this lime water treatment; it seemed to have quite a run through the city of Philadelphia, where there were a great many cases of this disease. It was tried, and at first there was little or no change. The owner came over several times and said he was sick of paying the hospital bill on the horse and they better destroy him. He was told not to be too hasty, and at last he turned round and gave the horse to the University. Well, they continued the lime water treatment for a while, and the owner shortly afterward got a letter stating that his horse was all right. He then returned, paid the hospital bill on the horse, and they allowed him to take his horse. This horse had the usual swellings around the head and the inferior maxillary bone, and, as had been diagnosed before, he had been lame in the different extremities, and rest usually was a cure. Now, in regard to the disease being localized to the head alone, I can say I have seen cases that were destroyed at college where there were no other evidences of the disease than those about the head, while in other cases there were well marked signs of osteoporosis throughout the body.

Dr. Hoskins.—I can well understand in this case that Dr. Morris has reported here, why the entire body was afflicted. The animal was but little over two years of age; the process of calcification of the bones had not been completed. As he well denotes there, in the inferior extremity of the femur, where one of the centers of ossification or calcification resides, he has the whole of the inferior extremity, or that whole center, to drop off. Why ? Because that had not been a completed process; and he certainly had a very acute case of the disease, and it found an easy road to attack the entire body, because the completion of the bony structures was yet to take place. In addition to that, this process had been materially hindered by the fact that this animal was put to more or less severe work ; and these factors will largely account for the fact of his having so acute an attack of the disease and its running so short a course.

The Chair.—I would like to ask Dr. McLeod whether he ever met with any of these cases in this city as a student or a practitioner.

Dr. McLeod, of Buffalo —Not but the one, and I presume you remember that case, of a large colt out at the street car barns. I am sorry to say there never was any post-mortem held in that case; he was simply taken out and shot and carted away. But his hind extremities, as Dr. Morris says, were straight, perfectly straight. This horse was two years old, and he measured 16.3 forward and 17.2 behind. There was three inches difference between his withers and his hips. One side of his face was swollen to some extent only; the other side was natural. That is the only case I ever remember seeing.

The Chair.—Was he lame ?

Dr. McLeod.—Why he was all out of shape. You could hear the bones in his

hind leg; you could hear a noise; used to thump every time he walked, as though they slipped out of joint.

Dr. Sutterby.—Luxation. What amount of lime water would you advise giving to a horse two years old?

Dr. Hoskins.—Give it *ad libitum*. A very good plan is to put a barrel in front of him, throw some lime in it, keep changing the water, and let him drink. What they do at Gloucester, when they get them down there, is to put them in front of a barrel of lime water and let them drink. If you don't stir the water—you know, of course, there is just so much that can be held in solution, and they may drink just as much as they want. There have never been any bad results follow from the adoption of that plan with them. Dr. Willganz says the colt at the University had a bushel of lime to a barrel of water.

Dr. Wende.—Dr. Drinkwater, do you ever meet any cases in Rochester? You have been there quite a long time.

Dr. Drinkwater, of Rochester.—I have had three or four cases, but I can't say that I have had any where the joints were affected, or any other part of the body than the head. I had a very decided case at Albion a few years ago, in a mare that was ailing for years—must have been 12 or 13 years of age; and she was perfectly sound in every other respect except her head, and that was in the same condition as this specimen that Dr. Morris shows, and the teeth eventually fell out. The animal was destroyed. I have the specimen, and I think the teeth are all out on one side, but not all on the other.

The Chair.—Couldn't that have been a case of osteosarcoma?

Dr. Drinkwater.—No, osteoporosis.

The Chair.—Not osteosarcoma as we were taught at college, what now is known as Ostitis deformans.

Dr. Drinkwater.—Oh, no, it wasn't that.

The Chair.—I have several specimens where the teeth have fallen out.

Dr. Drinkwater.—Yes, and the bone became solid.

The Chair.—I could reach in and take the tooth right out.

Dr. Drinkwater.—Not the same as you find in osteosarcoma.

The Chair.—I have seen a great many cases of osteoporosis, but I never saw a case where the teeth fell out, or where you could pull them out with the hand.

Dr. Drinkwater.—Well, I could in this case.

The Chair.—But in sarcoma I have.

Dr. Hoskins.—I might state, too, that the age of this horse was rather against the probability of its being osteoporosis, and would make it more likely to have been osteosarcoma. Of course the microscope would have been the only thing to determine. You all remember the remarkable case of "Prospero" that they had up in New York State a number of years ago. In that case you remember the controversy among the veterinarians who had examined him. He was a noted runner, a stallion I think. His trouble had been diagnosed by a veterinarian from New York City as osteoporosis, and subsequently another veterinarian dentist was called n and said it was nothing but his teeth, and he removed two of them and hid them, or took such good care of them no one was ever able to see them—and failed to find any lesion of the teeth, any caries of them, or of the alveolar cavity, and he pronounced the horse, if you remember, on the road to recovery. He continued to lose flesh, and when he died I think he weighed 550 pounds. His head was removed to New York City and examined, and it proved to be a case not of osteoporosis, but osteosarcoma. It took the microscope to determine the nature of

the lesion. All the symptoms, as far as could be observed, pointed to osteoporosis. I believe I have never seen a case develop after eight years of age. I have seen horses 12 years of age have it, but they had had it for years ; it localized itself in the head.

The Chair.—Dr. Hinkley, we have not heard from you.

Secretary Hinkley.—Unfortunately for me, I was absent during the reading of Dr. Morris' paper. So far as my own experience is concerned, I have had very few cases, not over 25 or 30, in my practice. Some have made very nice recoveries; others have died. I notice that the cases where turned out as incurable and left to themselves made a beautiful recovery, not through any shrewdness on my part, but simply observing them, so that I have been in the habit recently of ordering these horses turned out. I had one case in particular of a Waveland Chief colt. I should say we elevated him in the hospital about three or four weeks ; elevated him three times a day to eat, and as some one remarked, he was lame all over ; the inferior maxilla was very much enlarged ; the joints were all enlarged ; the peculiar arch in the back ; and he was a sorry looking object. It came on in the month of April, and a little later the pastures became very good, and we took him in the ambulance out to pasture, turned him in there, and he was sold last fall at a sale in Cleveland, and brought four hundred and some odd dollars, and went West as a stock horse. That was only one of the cases that made a good recovery. I fully agree with what little I have heard Dr. Hoskins say ; I think that in the treatment rest is one of the essential points. The lime water treatment is entirely new to me ; I never heard of it before.

Dr. Morris.—I would like to say a word. Prof. Richardson of the Toronto Veterinary College is with us, and perhaps he could give us some light on this subject. I would ask the courtesy of the floor for Prof. Richardson, if he will kindly speak to us.

Prof. Richardson.—I won't attempt to speak from the medical point of view at all, but two or three points of interest occur to me in connection with the purely chemical side of the question. So far as I understand, you have before you a process of decalcification of the osseous tissues. The surroundings of the cases, I think, might throw a good deal of light on the causes of the disease. For instance, you have mentioned certain cases in which young animals have been put to excessive work at an early period of their growth. In others you have an unsanitary condition, improper ventilation. You have also the fact that this disease is not limited to certain localities, but you will meet it on the blue grass of Kentucky, you will meet it elsewhere, where there is no limestone, and you will meet it even, as your President has said, on so essentially a limestone formation as lies north of Buffalo here Now, it cannot be said, speaking chemically, to be due to a lack of lime in the food, because if this were so, those portions of the country which are situated upon limestone ridges, where there is plenty of lime in the soil, ought certainly to be free from the disease. From the glance that I had at some portions of the bones, it strikes me that it is due not so much to a lack of lime salts as to an inability to digest or assimilate them into the system. It seems to me that it is entirely due to decalcification, or, in other words, a taking up of the calciferous salts that have already been deposited. Now, we know that one of the greatest agents at our command in the animal economy for carrying the calciferous salts is carbonic acid. We see this in cases of rheumatism, where there is a lack of carbonic acid in the blood, and where the calciferous salts are deposited. If at any particular point in the body there should be, due to local innutrition or other causes, or

excessive use of certain of the muscles, an undue preponderance of carbonic acid in that vicinity, and the system, owing to unsanitary conditions, or local conditions, is not able to eliminate the carbonic acid rapidly, it may be eliminated through the calciferous salts taken up by the excess of carbonic acid—may then be eliminated through the channel of the kidneys ; and I think if you were to make—I speak this now from theory—if you were to make a careful examination of the urine you might find that the phosphatic salts were very much in excess. From these two chemical points you might reason—infer—that the disease might be met with the lime treatment ; that is, throwing a large excess of an alkali into the system, and in that way neutralize the action of excessive quantities of carbonic acid. At the same time I would also point out the advantages of sanitary surroundings; of placing the animal out in the open air, where the rapid elimination of the carbonic acid, or probably other acidulous salts, which ought to be eliminated, can be eliminated more readily. These points seem to me to be intimately connected with the disease as presented this afternoon.

Dr. Hoskins.— I would like to ask Prof. Richardson how he would account for an enzootic outbreak among colts that were running at grass and not under cover or shelter at all.

Prof. Richardson.—That might be due to causes already pointed out; that is, the change in atmospheric conditions, with the changing food.

Dr. Hoskins.—I might state that these animals were not being fed at all ; they were simply grassed, and were dependent wholly upon the grass, and had been for a period of five or six months prior to the enzootic outbreak that I have referred to. I might also state that observations in Cincinnati by Dr. J. C. Meyer, Sr., indicated that an enzootic outbreak that occurred there one year, covering a limestone district, the year being an exceedingly dry one—might it not be that the dryness of the ground prevented the forage from taking up the usual amount of salts that grass and other forage takes up usually? and, therefore, the disease occur, the animals having fed on that for a long period of time, from not receiving the usual amount of salts necessary to maintain the equilibrium of the body and build up the osseous structures as well as the other tissues of the body ?

Prof. Richardson.—I am speaking very largely, of course, upon the point that it is a decalcifying process almost entirely. I can well conceive that under certain circumstances—for instance, in seasons of early dryness, the grain ripens rapidly, before it has perfectly matured, and not only would the grain be deficient in phosphates, so essential to the building of bony structure, but it would also certainly be to a greater or less extent deficient in both flourine compounds and in salacious compounds, and in that way the disease may be pre-induced, from a want both of chloride of calcium and from silicates, as well as the tricalcic phosphate.

The Chair.—I would like to ask Dr. Bell, of Watertown, whether they are troubled with osteoporosis up his way.

Dr. Bell —Not very often. I have seen but two cases in nine years.

The Chair.—We also have Dr. Bell, of Erie, with us. We should like to hear from his territory on this subject.

Dr. Bell, of Erie. —We have nothing of any account, Mr. President.

Dr. Sutterby.—How did the cases terminate that you had, fatally ?

Dr. Bell, of Watertown.—Yes, sir.

Dr. Sutterby.—I move that this Society tender Dr. Morris a vote of thanks for the able paper on osteoporosis which he has presented here to-day.

Dr. Bell, of Watertown.—I second the motion. (Carried.)

EDITORIAL.

VETERINARY TITLES.

"Thou art not so long by the head as honorificabilitudinitatibus." (Shakespeare.) —*Love's Labour's Lost, V. 1.*

When Hercules found the hind, with his cart stuck in the mire, bellowing for help, he told him that the "Lord helps those who help themselves," or something of that sort. The God who was first appealed to by the veterinary profession for help, in the preliminary steps of "elevating" their guild, must have given the same advice, which the Horse Doctor and Cow Leech followed with a vengeance. An inspection of the "Veterinary Register" at a County Clerk's office does not seem to indicate that the inscriber's knowledge of the use of the letters of the alphabet and meaning of their combinations has any influence upon the number of those which he suffixes to his name, with or without reason or right. To make things easy, however, the legislators who formulate the restrictions upon freedom which civilized communities call "laws," and their henchmen, the executors of these laws, who find a dollar or so fee with each registration, do not bother much about the "Vet." The United States Government, New York, Pennsylvania, and other great Commonwealths, receive and recognize as peers, accept testimony in courts from, and appoint to offices requiring professional skill, man for man alike, whether his credentials are under the seal of an honorable institution of learning, or his signature is John $\overset{\text{HIS}}{\underset{\text{MARK.}}{\text{X}}}$ Doe.

Great Britain has a certain uniformity in title, and the graduate from London, Edinburgh and Glasgow alike, is an M.R C.V.S. (Member of the Royal College of Veterinary Surgeons), recognized everywhere as a legally qualified practitioner. The Royal College publishes a register in which can be found a record of the graduates, IF, in their peregrinations to Canada, the United States and elsewhere, they remember from time to time to remit a five dollar gold piece to their Alma Mater or whoever composes the Board of Registry, but who is dropped from the rolls if he fails to pay.

America, being a larger country, gives the "Vet" a more liberal and larger choice of titles. In New York, the two schools, each of which has "the only legal charter in the State to grant diplomas," make Veterinary Surgeons, V.Ss., and Doctors of

Veterinary Surgery, D.V.Ss., respectively. Harvard and the University of Pennsylvania—both great centres of learning, appreciated that medicine is a more comprehensive word than, and *includes*, surgery, so they make Doctors of Veterinary Medicine, but the classical teachers of one of the universities were at fault in their Latin and the one makes V.M.Ds., while the other has M.D.Vs., and the Iowa State Agricultural College compromises by turning out D.V.Ms. Montreal, when it found shelter under the Ægis of McGill University as a Faculty of Comparative Medicine and Veterinary Science, became osteo-porotic and elevated the V.S. to D.V.S., but not to a plain D. V. *Surgery*, like a New Yorker, but to a D. V. *Science*. Chicago, in view of the white palaces and thronging multitudes which Columbus brought to the lake shore, became positively megalo-cephalic, and turned out M.D.Cs. (*Doctors of Comparative Medicine*) instead of simple V.Ss. as formerly. Graduates from French schools translate their diploma of "*Vétérinaire*" into *Veterinarian*, while the German "*Thierarzt*," or Animal Doctor, can make his own choice from American abundance in nomenclature.

The catalogues of some of the Veterinary schools do not give the degree conferred, and copies of their diplomas are not available, so that corrections to the following list is requested:

INSTITUTION.	DEGREE.	ABBREV.
University of Pennsylvania.	Veterinariæ Medicinæ Doctor.	V. M. D.
Harvard University.	(?)	M. D. V.
Iowa Agricultural College.	(?)	D. V M.
McGill University (Montreal).	Doctor of Veterinary Science.	D. V. S.
American Veterinary College.	Doctor of Veterinary Surgery.	D. V. S.
Ohio Veterinary College.	Doctor of Veterinary Science.	D. V. S.
Detroit Veterinary College.	Doctor of Veterinary Science.	D. V. S.
National Veterinary College.	Doctor of Veterinary Science.	D. V. S.
Chicago Veterinary College.	Doctor of Comparative Medicine.	M. D. C.
New York College of Veterinary Surgeons.	Veterinary Surgeon.	V. S.
Ontario Veterinary College.	Veterinary Surgeon.	V. S.
Kansas City Veterinary College.	(?)	
Cornell University.	Bachelor of Veterinary Science.	B. V. S.
Indianapolis Veterinary College.	Veterinary Surgeon.	V. S.
Royal College, London. Dicks', Edinburgh. New, Edinburgh. Glasgow.		M. R. C. V. S.

When titles become further complicated by the possessors having an M.D., a Ph.D., Sc.D., or an honorary title from the Royal College, the abracadabra of the evidences of learning becomes formidable.

Perhaps as long as the course of instruction in the various schools ranges from a few months to three years, it is well to have the titles distinctive, so that the initiate may understand that :

S. V. D.=Instruction for one winter+$87 fee.

D. S. V.=24 months' hard study+rigid examinations.

S. V. D.+D. S. V.=No recognition by Government.

H. H. H.=Spavin cure protected by Government Patent.

John Smith (painter by trade)=Government Cattle Inspector

It may not be time to ask for a unity of title until the regularly and properly educated veterinarian is legally recognized by the Government. We think, however, that this question is of sufficient importance to be discussed by the United States Veterinary Medical Association. The latter is a body which must become the controlling institution of the profession at large. It is a voluntary association, organized for the general good and now entirely free from any local prejudice or affiliation with schools or colleges, which latter are always influenced more or less in any changes by the pecuniary result. The United States Association has recently granted to its members the privilege of using its seal on stationery, which was a wise move so long as it guarantees the professional and reputable standing of its members ; it would be fortunate if it could adopt some short, comprehensive, distinctive title.

NOTICE TO THE VETERINARIANS OF THE STATE OF NEW YORK.

The New York State Veterinary Medical Society will hold its Fourth Annual Meeting at the Assembly Room of the Vanderbilt House, Syracuse, N. Y., on Tuesday and Wednesday, January 9th and 10th, 1894. The meeting will commence at 11 o'clock A. M., January 9th. This meeting will be the last one to be held in the month of January, as, according to the revised By-Laws adopted by the Society at last meeting held in Buffalo, Oct. 11 and 12, 1893, hereafter the Society will hold its meetings during the month of September, each year, and the place of holding said meeting will be decided by a vote of the majority of the members present at the close of the Annual Meeting. The January meeting will be an interesting one to all veterinarians. There will be several papers read and discussed. The business portion of the meeting, consisting of Election of Officers, Reports of Secretaries, Treasurer and Committees, and Auditing of Accounts, will be made as short as possibie, thereby giving more time to the reading and discussing of papers. The names of those writing papers and the subjects will be printed in the January issue of the JOURNAL. All desiring to apply for membership should address the Secretary at once. Printed notices will be mailed to all veterinarians.

Respectfully,

No. 395 Ellicott Street,
Buffalo, N. Y.

N. P. HINKLEY, D. V. S.,
Secretary.

SOCIETY PROCEEDINGS.

MASSACHUSETTS VETERINARY ASSOCIATION.

The regular meeting of the Massachusetts Veterinary Association was held at 19 Boylston Place, Boston, Wednesday evening, January 25th, 1893, at 7.30 o'clock.

President L. H. Howard in the chair. Members present, Drs. Winchester, Osgood, Winslow, Stinson, La Baw, Blackwood, Marshall, Hadcock, Bryden, Parker, Emerson, Beckett, Burr and Harrington. Honorary member, Dr. Stickney. Visitor, Mr. Naylor. In the absence of the secretary, the President appointed Dr. Parker secretary *pro tem*. Unfinished business, none.

Reports of Committees.—Dr. Osgood for the Executive Committee reports favorably upon the credentials of H. P. Rogers, M.D.V. (Harv.).

Dr. Winchester reports a meeting of the U. S. V. M. A. comitia minora in New York, January 20th, when it was decided to hold the next annual meeting in October, instead of September. This was necessary on account of several different congresses meeting in Chicago in September.

Admission of members.—Names of C. R. Simpson, D.V.S., and T. W. Shaw, D. V. S., were balloted upon. Eleven votes cast, all in the affirmative; they were therefore declared elected.

Dr. La Baw then read a paper upon "Punctured Wounds of the Foot." A general discussion of the question followed, taken part in by most of the members present, the debate not only involving punctured wounds of the foot, but its sequelæ such as quittors, synovitis, ringbone and tetanus. Motion made by Dr. Winchester, seconded by Dr. Winslow, that the essayist be given a vote of thanks. Carried.

Dr Osgood then introduced an agent from a Chicago firm of instrument makers, who invited the members of the Association to inspect samples of veterinary instruments at the Harvard Veterinary School. After a desultory discussion on the respective merits of hot and cold applications in synovitis and laminitis; toe and quarter cracks; and spavin, its causes and treatment, the meeting adjourned.

J. M. Parker, Secretary *pro tempore*.

The regular meeting of the Massachusetts Veterinary Association was held at 19 Boylston Place, Wednesday evening, February 22nd, 1893.

President L. H. Howard in the chair. Members present, Drs. Howard, Marshall, Peterson, Winchester, Winslow, Parker, and the Secretary. Honorary member, Dr. Stickney.

Records of the last two meetings read and accepted. Unfinished business, none. Reports of committees, none.

Admission of members.—Name of Howard P. Rogers, M. D. V. (Harv.),

balloted upon ; seven votes cast, six in the affirmative and one blank ; the President declares Dr. Rogers elected.

Papers and Discussions.—Dr. Blackwood was to have read a paper, but he was absent, so no paper was read.

Dr. Parker reported a case of azoturea ; it was like any case of this disease, with the exception that it came on without any exercise to speak of to induce it ; the animal had been idle in the stable for a week, and dropped down with azoturea in walking back from the water-trough to its stall, it having just taken a drink of water.

The members present then discussed the humbuggery of the Massachusetts law providing for the appointment of a cattle inspector in every city and town in the State by the Mayor or Selectmen. In places where competent men were appointed the law works well enough : for example, Dr. Burr in Boston, and Dr. Peterson in Waltham and Watertown. On the other hand the cattle inspector in Wayland is a painter, in Andover a blacksmith, in North Andover a farmer, and so on through a long list that makes an attempt at the suppression of tuberculosis or other infectious cattle diseases little better than a farce. A discussion of meat inspection in abattoirs followed, considering the danger, if any, from actinomycosis, and also the question where is the line to be drawn between a tuberculosis carcass fit for use as human food, and one so bad that it must be thrown away ?

Meeting then adjourned. AUSTIN PETERS, Secretary.

The regular meeting of the Massachusetts Veterinary Association was held at 19 Boylston Place, Wednesday evening, March 22nd, 1893, at seven-thirty o'clock.

President L. H. Howard in the chair. Members present, Drs. Bryden, Blackwood, Burr, Emerson, Hadcock, Howard, Winchester, Winslow, Parker, La Baw, Carlton, Simpson, Rogers, and the Secretary. Honorary member, Dr. Stickney.

Minutes of the previous meeting read and accepted.

Applications for membership.—Application of Dr. E. H. Holden, of Springfield, received and laid on the table for a month under the rules.

The President calls the attention of the members to the fact that it is time to take action upon our annual meeting. Dr. Winchester makes the motion : "That the annual meeting and dinner be held at Young's Hotel, and that a committee of three be appointed by the chair to arrange the details, and that the President be one of the committee." Seconded by Dr. Parker. Motion put by the Secretary and carried unanimously.

The Chair announces Drs. Winchester and Osgood as the other two members of the Committee of Arrangements.

Dr. Winchester moves : "That the hour of the annual meeting be five-thirty." Seconded by Dr. Winslow. Carried.

Dr. Winslow moves ; "That the cost of the dinner be restricted to $5.00 per plate" Not seconded.

Dr. Parker moves : "That the price of the dinner be left to the discretion of the Committee." Seconded by Dr. Simpson. Carried.

Dr. Winslow moves : "That the guests to be invited be left to the discretion of the Committee." Seconded by Dr. Simpson. Carried.

The Secretary informed the members that Dr. Liautard had just sent them a

copy of his new work on surgery, for the Association's library, and also a lot of back numbers of the Review, which now makes the file of the Association complete, with the exception of two numbers missing, in different years, which are now out of print. Moved by Dr. Winchester, that the Association tender Dr. Liantard a vote of thanks for his contributions to its library. Seconded by Dr. Blackwood. Carried.

Moved by Dr. Winchester: "That the Association's vote of thanks be given to the Secretary for some odd numbers of Fleming's Journal, which he had given to make the file complete." Seconded by Dr. Blackwood. Carried.

Dr. Parker read a very interesting paper on "Scouring in Calves," * followed by a general discussion, in which the members present took part.

Dr. Winchester remarked that he thought the paper one of the best ever read before the Association, and moved that the essayist be given a vote of thanks for his paper. Seconded by Dr. Stickney. Carried.

Dr Parker then reported a case and showed a specimen of, thrombosis of the external iliac artery. The clot in the external iliac was several inches long and completely filled the lumen of the vessel; there were also two parasitic aneurisms in the coeliac. The thrombus could not be felt ante-mortem per rectum, as the plug was too low down, but the leg was cold and the horse was lame on it (off hind), there was inflammation of the laminæ, separation at hair and hoof, periostitis of os-pedis, and caries of part of it, colicky pains at times, at other times would have dizzy spells and throw himself down and thrash around. Was finally shot.

Meeting then adjourned. AUSTIN PETERS, Secretary.

The tenth annual meeting of the Massachusetts Veterinary Association was held at Young's Hotel, Boston, on Wednesday evening, April 26th, 1893.

Dr. L. H. Howard in the chair. There were present Drs. Bryden, Blackwood, Howard, Osgood, Saunders, Winchester, Winslow, Marshall, Burr, Beckett, Simpson and Rogers. Honorary members, Drs. Liautard and Stickney.

The minutes of the previous meeting having been read. Dr Bryden desired to make a correction. At the previous meeting he had called attention to Dr. Bolton's report on the case of the spring-halt horse; that report he thought would convey the impression that the horse was killed in consequence of the failure of the treatment instituted by him, when in fact the horse was procured with intention and for the purpose of killing it for p. m. examination. Dr. Bryden further called attention to the fact that the patient distinctly improved while under treatment.

The minutes were then accepted with this correction.

Admission of members.—Dr. E. H. Holden was unanimously elected a member, ten votes being cast, all in the affirmative.

Election of Office Bearers.—For *President, Dr. Burr*, nominated by Dr. Osgood seconded by Dr. Winslow, unanimously elected. Dr. Burr then took the chair. Dr. Bryden then nominated *Dr. Beckett* for *First Vice-President;* seconded by Dr. Winchester; unanimously elected. Dr. Howard nominated *Dr. Winslow for Second Vice-President;* seconded by Dr. Winchester; unanimously elected. *For Secretary and Treasurer, Dr. Parker;* moved by Dr. Osgood, seconded by Dr. Winchester; elected.

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*See page 227, October Journal.

Executive Committee: Drs. Blackwood, Osgood, Labaw and Saunders. in order.

There being no new business the members adjourned to the banquet hall, where the annual dinner was partaken of, and where the genial toastmaster, Dr. Bryden, kept the ball rolling till a late hour.

JOHN M. PARKER, Secretary.

The regular meeting of the Massachusetts Veterinary Association was held a 19 Boylston Place, May 24th, 1893, at seven-thirty o'clock P. M.

There were present Drs. Blackwood, Howard, Osgood, Winchester, Winslow, Burr, Labaw, Simpson and Rogers. Honorary member, Dr. Stickney.

The President, Dr. Burr, in the chair.

The minutes of the last meeting having been read, a long discussion ensued as to whether that portion of the minutes which refers to the meeting previous to the annual meeting should be adopted. Some of the members were of the opinion that if any reference were made to the discussion relating to the "Spring-halt horse," the record of the discussion should be more complete.

Dr. Blackwood moved "That the minutes be accepted as read." Seconded by Dr. Winchester.

Dr. Howard then moved as amendment, "That the records, or such portions of the records of the Annual Meeting as refers to the meeting previous to the Annual Meeting, *i.e.* the March Meeting, be not accepted until such records of previous (March) meeting be reconsidered and corrected by Dr. Peters." Seconded by Dr. Osgood. Carried.

New Business.—Dr. Osgood then read a letter from Dr. Peters, enclosing on from Mr. Appleton, in which Dr. Peters, or failing him some member of the Association, is asked to prepare a paper for the meeting of the Agricultural Congress to be held at Chicago in October. Dr. Howard suggested that Dr Billings be asked through Dr. Peters to comply with Mr. Appleton's request. Unanimously agreed to. Meeting then adjourned.

JOHN M. PARKER, Secretary.

The regular monthly meeting of the Massachusetts Veterinary Association was held at 19 Boylston Place, on Wednesday evening, June 28, 1893, at seven-thirty P. M.

There were present Drs. Beckett, Bryden, Burr, Emerson, Howard, Parker, Peters, Simpson and Winchester. Dr Burr in the chair.

The minutes of the last meeting having been read, Dr. Howard moved that they be accepted as read. Seconded by Dr. Winchester. Carried.

Dr. Peters then explained that he had destroyed the notes of the March meeting, and that in many cases he had considered it advisable to omit from the minutes certain portions of the discussions, especially such parts as were at all personal in their nature.

Dr. Howard then read from Mr. Bolton's report, and showed that he was not responsible for the portion complained of by Dr. Bryden, the mistake being Mr. Bolton's, and not his (Dr. Howard's).

Dr. Bryden. said it had only been his intention to call attention to a mistake

in the "Report."

Dr. Winchester then moved that the affair be dropped, and that the minutes of the March meeting stand as they are. Seconded by Dr. Howard. Carried.

Dr. Winchester then moved that the minutes of the April meeting stand as they are. Seconded by Dr. Bryden. Carried.

Dr. Burr then proposed the name of Dr. William Councilman, M. D., as a member; but on referring to the Constitution it was found he was not eligible for membership.

Dr. Howard then moved that William T. Councilman, M. D., of Harvard Medical School, be given an invitation to attend the meetings of the Association, and engage in discussions, and that the Secretary be instructed to send a notice of each meeting. Seconded by Dr. Winchester. Carried unanimously.

New Business.—The Secretary then called attention to lapsing of Amendment No. 1 to Article II of Constitution.

Dr. Winchester wanted to know what benefits have resulted from the Amendment.

Dr. Peters showed that there had been a large increase in the membership.

Dr Howard thinks get more members, because many new members do not care to read papers. After considerable discussion, *Dr. Bryden* gave notice that at the next meeting he will move that Article II, Section A, be so amended that said section is rendered inoperative for a period of two years from April, 1893.

Dr. Winchester then read open letter from Harvard Veterinary School. He thinks such advertising belittles the profession.

Dr. Howard would like to see the subject of Ethics thrashed out. Let those who do not believe in Ethics stand up and defend their position; but if we have a code of Ethics, let us live up to it. It was then arranged that at next (September) meeting the subject of Ethics be thoroughly discussed.

Dr. Bryden then read an instructive paper on "Hoof Culture,"* after which an interesting discussion ensued. Dr. Howard thought that there were a great many points in which the members of this Association thoroughly agree with the essayist. (In a greater number perhaps than even he realized)

Dr. Peters then moved a vote of thanks to essayist. Carried unanimously. The meeting adjourned till further notice.

JOHN M. PARKER, Secretary.

The regular monthly meeting of the Massachusetts Veterinary Association was held at 19 Boylston Place on Wednesday evening, September 27th, at seven-thirty o'clock. The President, Dr. Burr, in the chair.

The members present were Drs. William M. Balmer, E. C. Beckett, Thomas Blackwood, William Bryden, Alex. Burr, D. Emerson, E. C. Hadcock, L. H. Howard, W. Labaw, Alex. Marshall, F. H. Osgood, J. M. Parker, J. F. Winchester, Chas. Winslow, and Honorary Member Dr. Stickney.

Dr. Howard moved that the minutes be accepted as read; seconded by Dr. Blackwood. Carried.

Dr. Bryden then moved that "Article II, Section A, of the Constitution be so amended that said section is rendered inoperative for a period of two years from April, 1893." Seconded by Dr. Blackwood. Carried unanimously.

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* See October JOURNAL.

The Secretary then read a letter from Dr. Hoskins, Secretary to the U. S. V. M. A., asking that delegates be appointed to attend the Veterinary Congress to be held in Chicago during the third week in October. After some discussion on the subject Dr. Osgood suggested that it would be a good plan to do as the Association has done in the past, and appoint as delegates those who intend going to Chicago.

The President then asked the names of those who intended going, and later appointed Drs. Beckett, Winchester and Emerson to act as delegates.

Dr. Howard then moved that the Secretary be instructed to communicate with Dr. Hoskins, and inform him that, in compliance with his request, this Association had appointed as delegates Drs. Winchester, Beckett and Emerson. Seconded.

A letter was then read from Dr. Hinkley, Secretary of N. Y. Veterinary Association, with regard to a meeting of the two Associations this year. After a good deal of discussion the subject was dropped, as most of the members seemed to think it would be a complete failure.

The Chairman then called on Dr. Winslow to open the discussion on Ethics. He was followed by Drs. Howard, Blackwood, Winchester and others.

After a lively discussion on this subject, Dr. Howard moved that the discussion be continued at the next meeting. Seconded by Dr. Hadcock. Carried. The meeting was then adjourned till next month.

JOHN M. PARKER, Secretary.

KEYSTONE VETERINARY MEDICAL ASSOCIATION.

The regular meeting of the Keystone Veterinary Medical Associaton was held Nov. 16, 1893. The meeting was claled to order by the President, Dr. R. A. Webster.

There answered roll call: Drs. Hoskins, Webster, Bridge, Lintz, Gœntner, Kooker, Weber, J. R. Hart, W. L. Hart.

The minutes of the previous meeting were read and approved.

The application of Dr. W. L. Rhodes, Lansdowne Pa., (American Veterinary College,) was received for membership, and was referred to Trustees to be reported at next meeting.

It was moved by Dr. Hoskins and seconded, that the Board of Censors be authorized to look after the Prothonotary office, to make the necessary changes and notify all the veterinarians to register.

Dr. Hoskins gave a very interesting report of the Veterinary Congress held in Chicago, for which the Association gave a vote of thanks.

The following were elected officers to serve for the ensuing year: President, Dr. Chas. B. Gœntner; Vice-President, Dr. S. E. Weber; Secretary, Dr. Walter L. Hart; Treasurer, Dr. Francis Bridge.

The next meeting will be held at the office of Dr. Hoskins, 3452 Ludlow Street, second Tuesday in December. Dr. S. E. Weber, essayist.

Philadelphia. W. L. HART, Secretary

Report of the Proceedings of the Society for the Study of Comparative Psychology in Connection with the Faculty of Comparative Medicine and Veterinary Science of McGill University, Montreal, Canada, for the Session of 1892–93.

A meeting of the Society was held at the usual place, the lecture-room of the Faculty of Comparative Medicine and Veterinary Science, for the election of officers, on Nov. 2nd, 1893, with the following results: Hon. Pres., Dr. D. McEachran; President, Dr. Wesley Mills; 1st Vice-Pres., Dr. M. C. Baker; 2nd Vice-Pres., Mr. Brainerd; Sec.-Treas., Mr. Sturroch; Corresponding Sec., Mr. Ewing.

A meeting was held on Nov. 14th, the president, Dr. Mills, occupying the chair. The attendance was large, and after the minutes of the preceding meeting had been read the question was raised as to the advisability of offering prizes for essays of sufficient originality and merit. Several gentlemen present expressed their views on the subject, and it was finally decided by vote of the majority that two prizes should be offered for the two best essays read this session.

Mr. Glen Campbell read an interesting paper, entitled "The Child and Our Domestic Pets," and Mr. A. S. Cleaves one on "Animal Psychology." The gist of the former gentleman's thesis was a comparison of the psychic development of the child, the colt, and the dog. He pointed out that those animals that are produced singly seem to be the best, that "the noblest are ever the least fruitful" The dog, however, was an exception, probably due to man's interference by artificial selection, by education and by domestication. The modes of communication, one with the other, amongst the lower animals are somewhat difficult to understand. Our own language was crude in certain respects, taking for example the absence of a full language for smell. On the other hand, the sense of smell in the dog was most acute, the great memory for smell being a prominent characteristic of some breeds. By the association of impressions we draw conclusions, as when we determine what a substance is by seeing and then feeling it, or by tasting and smelling it, and in like manner the dog recognizes his master by the senses of sight and smell. Dogs are known to express their dislike of one another by the erection of the hair, and often, after having been romped with and been teased by their masters for a considerable time, will express their desire for a rest by growling. This is their natural means of asking to be left in peace, and why should their wishes not be complied with? He mentioned that at the present day the question of "mental telegraphy" was engrossing the minds of many scientists. In France and other continental countries it is customary for the regimental veterinary surgeon to inspect the horses daily before going to drill. Some of these horses actually knew when the doctor was on his rounds, and would suddenly become lame and feign sickness in order to escape being sent out to work. Love of the young is seen in all animals. He instanced a case of a dog carrying her puppies off the track on hearing and seeing an approaching train. This animal must have anticipated danger. Unfortunately, some time after the dog was itself run over and killed. Mr. Cleaves advised the members of the society never to neglect an opportunity of pointing out the existence of reasoning power amongst our dumb friends to any incredulous persons with whom they might come in contact. He believed, with most writers, that intelligence had reached a higher state of development in pure-bred animals than in mongrels. He related how

a horse, which had been over the way before, had led its owner safely out of a wood in which he had got lost. Another horse he owned at home appeared to distinguish between the harness used for driving and that for work. He suggested that much of the suffering of the human inmates of our hospitals was in great measure the result of their own folly, whilst that of the poor horses in our cities was frequently due to the brutality and thoughtlessness of their owners. Legislation, as a preventive means, did not seem efficient. Example and persuasion appeared to have more influence.

The reading of the papers was followed by a short discussion. Dr. Mills said he thought Mr. Campbell's statement about the dog saving her offspring a valuable one. There was a close similarity in the mistakes made by human beings in crossing tracks too frequently. One member remarked that the fact that pure bred animals were more intelligent than mongrels could be attributed to their more frequent association with human beings. The president called to mind that on more than one occasion horses and dogs had, after having undergone treatment at the college, returned when in need of medical aid.

At the next meeting Messrs. Brainerd and Ewing will read papers.

The next meeting of the Society was held on Nov. 28th, the president, Dr. Mills, occupying the chair. There was a very large attendance of members. Dr. Mills communicated the contents of a letter that he had received from a citizen illustrating companionship exhibited by two tramp dogs that for two years past have visited the fountain in Phillip's square. The bigger one of the two is usually in advance of his companion, and when the smaller one lags behind always waits for him to come up. Their attachment to each other is remarkable, and they both resent any interference from other dogs. At night the old one has been found curled up around the smaller one in some doorway.

The essayists of the evening were Messrs. Wylie and Orr. The former gentleman, under the title "The Intelligence of a Bulldog and the Collie," described some interesting incidents that had come to his notice. A bulldog he once owned developed great propensity for hunting, which is rather the exception than the rule with this breed, his favorite sport being the capture of ground hogs. This he did in a clever manner by intercepting the animal on its return to its burrow. By stealthy means he was successful in catching rabbits. He would pounce upon them unawares from behind, thus showing that he realized his success would not depend less on his fleetness than on strategy. A collie he also possessed had developed the "setting" instinct and would retrieve game in a dexterous manner.

Mr. Orr related a most remarkable case of intelligence displayed by a well known trotting mare in this province. She occupied a stall adjacent to that of a cow. Being in training and under special diet, it was noticed she tended to accumulate more flesh than could be accounted for. One evening he discovered her in the act of robbing the cow of her evening meal of grain. She stretched her head over the partition, quietly lifted the pail into her own manger, partook of the contents, and then, to clearly show that she foresaw the results that would have followed had her trick been discovered, placed the empty pail in front of the dejected cow. This act she repeated on every occasion. Some might think she returned it with the expectation of having it refilled, but after a few times she would have discovered that her wish was not gratified. He recounted several instances illustrating memory, revenge, and sense of duty displayed by some of his own animals.

The essays were both of considerable merit and were complimented by the president on the manner of their delivery.

An article on "Instinct," by C. F. Amery, which appeared in a recent edition of *Science*, was than read, at the request of the president, by one of the members. The writer's definition of instinct is that it is due to sensations being transmitted from their several local seats to the brain, where they present themselves as cravings, desires and appetites, imperatively calling for relief Instinct impels to action, but does not guide to its performance.

After a few remarks by some of the members the meeting was then adjourned until after the Christmas vacation, when Messrs. Tracey and Thayer will read papers.

At the meeting held the previous fortnight Mr. McGuire detailed some incidents showing great intelligence in a fox terrier he owned In its mature years it had not failed to remember the whistle Mr. McGuire had taught it to respond to when a puppy, although now the property of another gentleman, and would always show great joy on his return. He knew of a collie that usually accompanied its master when out driving. On one occasion this person having entered a house the horses became frightened and bolted. The dog immediately ran into the house and showed by unmistakable signs, that something was wrong outside. He had seen another dog once drive a chicken back to the yard from which it had wandered ; and a collie belonging to a friend of his would waken the groom of a livery stable by barking whenever any horse returned late at night, thus showing that he knew it was necessary for the animals to be assisted to their respective stalls.

The other essayist, Mr. Brainerd told of an old running mare, the favorite place for contesting her superiority being a level stretch on the road Years after, when she had served well her time, and had long since retired from the turf, the owner's wife had occasion to drive her. All went well until she came to the old course, when, to the surprise and consternation of the old lady she made the distance against time. This showed force of habit. An instance of a collie illustrated the deplorable state of the law with regard to dogs in some of the States of the Union. This dog was in the habit of taking and bringing the cows to and from the pasture. One of the cows having entered the garden, he followed it for the purpose of driving it out. A relentless boy threw a stone, severely hurting him. He was noted for his kindness, never having been known to bite anybody, but a few days later bit the boy. For this he had to pay with his life.

A meeting of the society was held on the 10th of Jan., 1893, the president, Dr. Mills, in the chair. Mr. Stevens read a lengthy and somewhat humurous paper on "The Intelligence of the Cat." He thought the cat was entitled to more study than it usually received, this probably because it does not seek to win attention and affection as does the dog. The nature of the dog is open and demonstrative ; that of the cat is reserved. It is easy to gain the affection of a dog and difficult to lose it On the other hand, it is difficult to win the affection of a cat and easy to lose it. As with all our domestic animals, so with the cat, intelligence can only be developed in proportion to the kindness and good treatment shown towards it. He deprecated the practice of shutting out cats at night time. By this practice for generations certain of them have developed a hereditary habit of night prowling. Treated as they should be, they will soon abandon nocturnal wanderings. However, even in this, cats have individuality, and there are some curious and perverse exceptions. Careful observation goes to show that the cat's native inclination is to hunt the mouse or the rat for sport rather than for food, and a cat that is well cared for is more likely to be successful as a sport seeker than a hungry grimalkin ; firstly, because it is more alert,

and, secondly, because it is cleaner. A hungry and unhappy cat does not keep its coat clean, and the keen-nosed mouse can therefore easily sniff out its whereabouts. All cats have not the instinct for mousing. Some, having been deprived of their kittens, have been known to act as foster-mothers to young mice or rats; and not even the pangs of hunger will make a mouser of a cat that has not inherited the instinct of that form of sport—an instinct that seems to run in families—like the taste for fox hunting in human beings.

The other essayist of the evening, Mr. Tracy, read an interesting paper, entitled "How do Animals Reason?" which showed much original scientific thought on the part of the writer. Such a question will often occur to persons of a sympathetic and enquiring nature and not those whose only investigations cease when they have found out the mechanical value of the animal to them. A person would hardly succeed in proving the power animals possess of generating ideas by a mere summary of instances of apparent reasoning. Firstly, a man must be able to account for his own thoughts; secondly, he must have a good knowledge of comparative anatomy and physiology and, above all, be a good observer. If he understands himself and knows enough about the structure and functions of the animal body to know that it is constructed after the same plan as his own, and has observed actions in, say, a dog, which strike him as being calculated and carried out much in the same manner as he himself would carry them out, and then draws his conclusions, his word should be more relied on than the person who listens to stories and attributes all to instinct, or because it is "the nature of the beast" to do so and so. His line of argument went to show that all reasoning phenomena have as their basis reflex nervous impulses, that they are essentially such vital processes, as opposed to automatism.

The next meeting was held on February 1st, the President, Dr. Mills, occupying the chair. The essayists of the evening were Messrs. Plaskett and Thayer. The former gentleman detailed in a comprehensive manner his views on the "Scope of the Animal Mind" The term "mind" is, broadly speaking, correlated with such nervous phenomena as do not come under the sphere of vegetative functions. Some occurrences illustrating intellectual power were quoted. A favorite mare, that had always shown a happy and contented mien, became greatly changed at the time her offspring was taken from her to be weaned. She would mope heedlessly around the pasture and appeared to be engaged in a search for her foal. At the same time the colt seemed equally averse to reconciliation to his solitary fate. On the fourth day they both appeared to have forgotten their sorrows, but the door of the colt s stable was found to be open. A watch was set, when it was found that the mare came about dusk and herself opened the latch with her lips and entered the stable. She remained all night with her offspring, and, as if fully understanding she was violating the decree of her owners, left before dawn and returned to the pasture, admitting herself by opening the gate also. She never became again the same confiding animal she was previously to her painful experience. He thought that the opening of the door and gate showed that animals may learn by imitation to perform certain actions, a view which the President afterwards suggested should not be too strongly advocated as they do not seem to imitate as much as they might. The physiology and pathology of the human brain has been worked out largely by the comparative method, but when the psychology is considered, this does not apply for the following reasons: 1. Impossibility of demonstrating mental processes. 2. Impossibility of man divesting himself of his own psychical loftiness and viewing he actions of his "poor relations" from their own plane. 3. Their inability to

speak or write the language of man or the impossibility of man determining the condition of their mind from language, expression, etc. Stalking of game has been correctly likened to the tactics employed by carnivorous animals in approaching their prey In both cases it has been called instinctive. To this he objected, quoting the methodical manner in which wolves approach their prey, which methods have been utilized by the Indians and hunters to successfully come upon deer They excite the curiosity of the quarry in a peculiar manner by making gradually narrowing circles around it until close enough to run it down, sometimes spending half a day in this If actuated by purely instinctive motives they would be morely likely to rush blindly at their distant prey. A tame fox he possessed tunneled the earth as far as its chain would permit it. At the distant opening of one of these holes it placed scraps in order to entice the poultry. This it succeeded in doing on more than one occasion and was not slow to make a meal of any unsuspecting duck that ventured too close. He touched on language, pointing out that this included the suggestion of ideas by other means as well as by voice Tone, perhaps imparted to some animals, especially dogs, the wishes of their masters. as he knew a collie that would only go to fetch the cows if told in an authorative manner and at the right time of day.

The title of Mr. Thayer's paper was "Modified Sex as Affecting Psychic Character." The superiority of the horse as existing in the state of nature to one as altered by man was pointed out, followed by an investigation into the cause thereof from a physiological standpoint He claimed that modification of the sex of the horse did not hurt the animal as an individual as much as it did the dog or other domestic animals, showing how this manifested itself physiologically as well as psychically. The psychological make-up of the entire horse and the modified animal were then contrasted. The attention of the members was then called for a few moments to the female it being suggested by the writer that for physiological reasons non-sexing of the female would probably not affect her as profoundly as the male, and the maternal state as affecting the female mind was also discussed. Maternity was largely instinctive, springing from reflexes, giving as illustrative of his views the case of a bitch without milk having been known to adopt a litter of strange puppies from their plaintive cries evoking past reflexes in that of her nervous system concerned in the function of lactation.

The regular fortnightly meeting of the Society for the Study of Comparative Psychology was held on March 1st, the president. Dr. Mills, in the chair. The essayist of the evening was Mr. Cecil French, and the subject of his essay "The Expression and Communication of Thoughts by Means of Definite Sounds in the Lower Animals." This subject was fast becoming one of great interest among scientific thinkers There should be no question that members of the higher orders are capable of expressing thoughts by definite sounds as evident to all observers. The apparent motives prompting these sounds, the variety of sounds emitted and the extent to which this faculty was developed in the various classes of animals was carefully pointed out ; ranging from insect life, the sounds made by the bee when angered, of the beetle or locust to attract the female, among reptiles, the warning hiss of the serpent ; among birds the range of tone was enormous, the variety of expression well marked and varied ; in the mammalia, the domestic animals and quadrumana received special attention ; the neighing of a horse when looking for his food, as well as the variety of expression in the voice of a dog, were wonderful and pointed to certain conclusions which may be proven to be a well defined language. This view was supported by Darwin. Mr. French in his paper gave a short

outline of the investigations of Prof. Garnier, who had done some very interesting work in this line on monkeys, and who was at present in Africa continuing these investigations.

On Feb. 16th a paper was read by Mr. Sturrock on "The Psychic Status of the Cat," based on original observations.

At the close of the session a meeting was held for the presentation of diplomas of honorary fellowship and the prizes for the best essays of the year.

To secure the diploma a member must have attended two thirds of all the meetings of the Society during two years, and presented a satisfactory original thesis on some subject in comparative psychology.

The prizes for the best essays were awarded by a special committee and went to Messrs. Thayer 1st, and French 2nd.

CHICAGO VETERINARY COLLEGE.

A NEW VETERINARY DEGREE.

The degree given by the Chicago Veterinary College has been changed from *Doctor of Veterinary Science* (D. V. S.) to *Doctor of Comparative Medicine* (M. D. C.)

This change was made at the unanimous request of the classes of '92 and '93 and eighty-five per cent. of the graduates. The main reasons given for the change are that M. D. C. is more appropriate, comprehensive, elevating, and less liable to be assumed by empirical practitioners than V. S., or any other combination of initials relating to the title.

Former graduates can avail themselves of the change by returning to the Secretary their old diplomas accompanied by five dollars, the cost of the new ones. Excepting the change in degree, the new diplomas will be as far as practicable fac-similes of the old.

The first diplomas bearing the new title were conferred on March 24th, 1893.

PROCEEDINGS OF THE FOURTH SEMI-ANNUAL MEETING OF THE NEW YORK STATE VETERINARY MEDICAL SOCIETY.

(*Continued from page 361.*)

REVISED BY-LAWS.

Chapter I.

Section 1. This Association shall be known as the New York State Veterinary Medical Society.

Sec. 2. The objects of the Society are to aid in elevating and regulating the practice of veterinary medicine and surgery in this State, and to contribute to the diffusion of true science, and particularly to the knowledge of the healing art, and to unite our energies, efforts and sympathies for the mutual benefit of all its members.

Sec. 3. This Society shall consist of qualified veterinarians residing in the State of New York.

Sec. 4. The officers shall be a President, a Vice-President, a Secretary-Treasurer and five Censors, all of whom shall be elected by ballot at an annual meeting, and a majority of all the voters present shall be necessary for a choice.

They shall enter upon their duties at the close of the meeting at which they were elected, and hold their offices for the term of two years, or until their successors are chosen, to whom they shall then, without delay, deliver up and transfer all moneys, books, manuscripts,vouchers and all other property belonging to the Society in their possession.

Sec. 5. This Society shall convene once in each year, and this meeting shall be known as the Annual Meeting, which shall be called no later than the fifteenth of September and not prior to the fifth of the same month. This meeting shall continue for two days. The opening hour shall be at eleven o'clock A. M., and may adjourn on the second day at such hour as a majority of the members see fit to determine.

Chapter II.

Section 1. It shall be the duty of the President to preside at all meetings of the Society, and to preserve order and decorum. He shall, at the opening of the Annual meeting, make a communication to the Society, setting forth the conditions of the veterinary medical profession in the State, with such suggestions in relation to its improvement as he shall deem appropriate.

Sec. 2. The Vice-President in the absence of, or at the request of the President, shall perform the duties of his office.

Sec. 3. It shall be the duty of the Secretary-Treasurer to record the minutes of the meetings of the Society. He shall keep on file all documents and certificates in relation to the Society that may be deposited with him. He shall give due notice

to each member of the time and place of each meeting. He shall notify the members of the several committees of their appointment when necessary. He shall receive all applications for membership, fees and other moneys due the Society. It shall be his duty to conduct the correspondence of the Society. He shall retain copies of all letters written by him in behalf of the Society, preserve and file all letters and communications received by him in his official capacity, and he shall report the same at all meetings of the Society. For such services the Secretary shall receive one hundred dollars per annum.

SEC. 4. The Secretary-Treasurer shall keep and be accountable for all money belonging to this Society received by him, and shall thereout pay such warrants as may be drawn for the use of the Society. He shall give security, to be approved and retained by the President, for the safe keeping of said moneys, and on the first day of each Annual meeting present a detailed report of the state of the treasury.

SEC. 5. It shall be the duty of the Censors to inspect the credentials of all applicants for membership, and to entertain none who present themselves unqualified. Credentials for application must consist of :

FIRST. A diploma from a legally chartered and incorporated College or University, whose reputation as an institution teaching the art of veterinary science is acknowledged and accepted as worthy in name, the instructors of such an institution four of whom must be legally qualified veterinarians.

SECOND. Any applicant for membership shall submit his name upon one of the Society's application blanks, duly vouched for by two of the members of the Society. And the applicant shall be of good social and moral standing, and honest in all his dealing with his fellow men.

THIRD. All candidates reported favorably by the Censors shall be balloted for by the Society. Those receiving a two-thirds vote of the members present shall be declared elected ; an adverse report will debar the applicant from membership.

SEC. 6. It shall also be the duties of the officers when satisfied that the applicant is entitled to membership to order the Secretary to fill out the following certificate :

SEC. 7. THIS IS TO CERTIFY, that ..... is a member of the New York State Veterinary Medical Society, that the above.... ....having produced satisfactory evidence, is entitled to full membership and the immunity of this Society.

IN TESTIMONY WHEREOF, we have affixed our hands and the seal of the Society.

This ....day of.... ....President.

.... Secretary.

(L. S.) ....Censors.

SEC. 8. Every candidate, before signing the By-Laws and receiving a certificate, shall be required to pay an initiation fee of Five Dollars ($5.00), together with the annual dues, which sum shall be appropriated to the use of the Society. The dues shall be $2.00 per annum, payable in advance.

Upon the presentation of the Secretary-Treasurer's receipt for this amount the Secretary shall present the candidates with a copy of the By-Laws and certificate of membership.

SEC. 9. The President, Vice-President, Secretary-Treasurer, and Chairman of

the Standing Committees shall constitute the Executive Committee, whose duty it shall be to carry into execution the By-Laws and regulations of this Society during its adjournment.

Chapter III.

Section 1. The committees of this Society shall be Standing and Temporary Committees.

The Standing committees are those whose duties continue through the year, and they shall be appointed by the President.

Temporary committees are those whose functions cease with the meetings of the Society. They shall be appointed by the President.

Sec. 2. There shall be a Standing committee of three, of whom the Secretary-Treasurer shall be one, to be called the Committee of Arrangements, whose duty it shall be to provide convenient rooms for the meeting of the Society and to attend to the reception of the delegates from other societies, and of invited guests.

Sec. 3. There shall be a Standing committee on Legislation, of three members, including the President and Secretary-Treasurer, the remaining one to be elected by the Society, who shall watch the course of State legislation pertaining to Veterinary medicine, and to take charge of such matters pertaining to medical legislation as shall be referred to them by this Society.

Sec. 4. There shall be a Standing committee of three, of whom the Secretary-Treasurer shall be one, to be called the Committee on By-Laws. Their duties shall be to make minutes of all revisions and additions to the present code, and prepare the same for publication

Sec. 5. The Secretary-Treasurer shall have power to appoint from the Society, in case of necessity, any member to act as his assistant.

Sec 6. The President shall, after the presentation of the Secretary-Treasurer's report, appoint an Auditing Committee of three members to examine said report, compare it with the vouchers, and submit the result of their examination to the Society.

Sec. 7. Immediately after the assembling of the Society, the President shall appoint as many temporary committees as the business interests of that meeting shall warrant.

Sec. 8. These By-Laws may be altered or amended by two-thirds of the members present, provided the said alteration or amendment has been proposed in writing at a previous meeting by two members ; and any article or section of these By-Laws may be suspended during a single meeting by the unanimous consent of the members present.

Sec. 9 Any member who shall be absent from two annual meetings, without a satisfactory excuse, may have his name dropped from the roll.

Sec. 10. All members two years in arrears for dues, may have their names dropped from the roll.

Duties of Members.

It shall be the duty of each member of the Society to attend each Annual meeting of the Society, so long as he shall be a member thereof, unless he shall be necessarily detained, in which case he shall communicate with the Secretary on or before the day of the Annual meeting, giving legitimate reasons for his absence.

Each member in attendance at meetings shall contribute to the interest and intelligence of the same by taking part in the discussions of the subjects presented. or by reading some professional communication relating to his daily practice or by the presentation of a prepared thesis of a professional nature.

Conduct of Members.

Any member who shall be deemed in the judgment of the Society to be unfit for continuing in membership, either in consequence of unprofessional action or from having adopted a course of conduct calculated to throw the Society into disrepute, shall be cited to appear at the next regular meeting and show cause why he should not be expelled, and if, at the said meeting, he refuses to appear, or if his defense should not be deemed sufficient, he may be expelled by an affirmative vote of two-thirds of the members present.

Rules for Members.

No member should leave the assembly room during the reading of any paper, or the discussion of the same, without first obtaining permission of the President.

The Appointing of Essayists

Before the adjournment of the Annual meeting the President shall designate five members as essayists for the next Annual meeting, and before announcing the same he shall obtain the consent of the persons so named, together (if they desire) the title of the subject they wish to discuss.

Duties Necessary to be Eligible to the Office of the President.

No member shall be eligible to the office of President of the Society until he has been a member of the Society for two years and in good standing.

Order of Business.

1. The Secretary shall call the roll.
2. The Secretary shall read the minutes of the previous meeting.
3. President's address.
4. Secretary's report.
5. Application for membership.
6. Board of Censor's report.
7. Election of members.
8. Report of committees.
9. Miscellaneous Business.
10. Treasurer's report.
11. Reading of papers, etc.
12. Election of officers.
13. Appointment of Committee's and Essayists.
14. Place of next meeting.
15. Adjournment.

Reinstatement of Members.

Section 1. Any member who becomes a non-member through his delinquency to pay dues and assessments, may be restored to full membership in the Society by paying to the Secretary Treasurer the full amount of his indebtedness at the time his name was stricken from the roll of members, and by the further payment of all annual

dues which have accumulated since the day he was declared a non-member to the day of his restoration, which shall be left to the discretion of the Board of Censors.

Any member who has been expelled from the society for violation of its laws, may through five members in good standing petition for his reinstatement.

Said petition shall be referred to the Board of Censors, with instructions to investigate the merits of the petitioner and to report their decision in the association. If favorable, a two-thirds affirmative vote of the members present will restore him to membership, after complying with any other requirements necessary. An adverse report is final.

WHEN AN ASSESSMENT CAN BE MADE.

Whenever there shall be *bona fide* bills of the Society's obligations presented for payment, and it shall appear that the Secretary-Treasurer has no money, or not enough to redeem the same, if in the judgment of the majority of the members present it shall be deemed expedient to cancel the obligation, an equal assessment can be made of all the members sufficient to relieve the entire indebtedness, or a portion thereof. But no assessment should ever be made to exceed the sum of five dollars per capita of the membership without the unanimous consent of all the members thereof.

Approved by the Society.

AN ACT

TO FIX THE PAY, ALLOWANCES AND RANK OF THE VETERINARIANS OF THE UNITED STATES ARMY.

Introduced in the Senate by Mr. Cameron.

Introduced in the House by Mr. Robinson.

Endorsed and recommended by Gen. Schofield and the War Department.

BE IT ENACTED by the Senate and House of Representatives of the United States of America, in Congress assembled:

SECTION I. That the pay of the United States Army Veterinarians shall be one hundred and twenty-five dollars ($125) per month, with the allowances, pensions, retirement, tenure of office and relative rank of a Second Lieutenant of Cavalry. *Provided*, however, that hereafter candidates for the United States Army Veterinary service shall comply with all the preliminaries now required from candidates for "The Army Medical Corps," and shall pass such examinations as the Secretary of War may direct.

SECTION II. This Act shall be in force and effect from and after its approval.

SECTION III. All Acts inconsistent with this Act are hereby repealed.

VETERINARY GRADUATES, 1893.

KANSAS CITY VETERINARY COLLEGE.

March 17th.—Degree.

Onesimus G. Atherton
Joseph Pott
William G. Hawkey
Charles Saunders

NEW YORK COLLEGE VETERINARY SURGEONS.

Degree V. S. (Veterinary Surgeon.)

Henry Amling, Jr.	N. Y. City
Ira K. Atherton	Arrowsmith, Illinois
William Cook	New York City, N. Y.
Charles Doerrie	Salisbury, Mo.
William J. Finn	Brooklyn, N. Y.
Herbert B. Hamilton	Boston, Mass.
Robert C. Helmer	Scranton, Pa.
Alexander Johnston	New York
Robert E. Jones	New York City, N. Y.
James H. Kelley	New Haven, Ct.
Harry W. Kornobis	Brooklyn, N. Y.
Dennis McAuliffe	New York City, N. Y.
Albert G. Mehrhoff	Little Ferry, N. J.
Irwin C. Newhard	Allentown, Pa.
Thomas F O'Dea	Ghent, N. Y.
Edward A. Paul	Brooklyn, N. Y.
W. L. Sturges	North Norwich, N. Y.
Isaac White	New York City, N. Y.
Fraley E. Winslow	Whitestone, N. Y.
Louis J. Wolfort	St. Louis, Mo.
Addison R. Wiley	Windsor, N. J.

CHICAGO VETERINARY COLLEGE.

March 24th.—Degree M. D. C. (Doctor of Comparative Medicine.)

Adamson, J. H. - - - - Norfolk, Va.
Anderman, F. W. - - - - Chicago, Ill.
Armstrong, G. E. - - - - Sanborn, Ia.
Babb, A. - - . - Springfield, Ill.
Barrett, Dan - - - - Cascade, Ia.
Baxter, C. E. - - - - Griswold, Ia.
Bennett, G. M. - - - - Chicago, Ill.
Binger, S. - - - - - Monroe, Wis.
Bovett, J. A. - - - - Chicago, Ill.
Bruette, W. A. - - - - - Chicago, Ill.
Casper, A. M. - - - - Milwaukee, Wis.
Casserly, W. H. - - - St. Paul, Minn.
Clark, W. G. - - - - Johnstown, Wis.
Cobb, G H., Jr. - - - Corning, N. Y.
Cole, W. H. - - - - Kewanee, Ill.
Crane, C. M. - - - - Waukesha, Wis.
Davis, F. H. - - - - Ensworth, Wis.
Deenis, C. G. - - - - - Ottawa, Ill.
Downs, N. H. - - - - Cleveland, O.
Draper, O. G. - - - - Macon, Mo.
Durack, J. D. - - - - Mineral, Ill.
Eaton, R. D. - - - - Minneapolis, Minn.
Eckley, M. C. - - - - Woodhull, Ill.
Eddy, J. H. - - - - Stockton, Cal.
Everton, C. G. - - - Monroe Center, Ill.
Faulkner, G. F. - - - Salinas, Cal.
Fay, G. H. - - - - Oakfield, Wis.
Goodale, O. - - - - - Toulon, Ill.
Gould, J. N. - - - Fairmount, Minn.
Gould, J. W. - - - - Fairmount, Minn.
Gwinn, W. T. - - - - Newman, Ill.
Gysel, R. - - - - So. Chicago, Ill.
Hagadone, G. L. - - - - Chicago, Ill.
Herzer, E. - - - - Milwaukee, Wis.
Higgins, R. A. - - - - Milwaukee, Wis.
Hill, Geo. C. - - - - Milwaukee, Wis.
Hill, M. V. - - - Minnesota Lake, Minn.
Ilstrup, F. A. - - - - Buffalo, Minn.
Kaylor, J. M. - - - - Barry, Ill.
Kermath, D. - - - - - Chicago, Ill.

Ketchum, F. D. - - - - Marseilles, Ill.
Koehne, Chas. - - - Paynesville, Wis.
Lamont, F. G. - - - - Esmond, Ill.
Leith, F. J. - - - - - Chicago, Ill.
Longnecker, A. O. - - - - Atlanta, Ill.
McAllister, J. H. - - - - Lee, Mass.
McDonald, J. T. - - - - Taylorville, Ill.
McGraw, E. F. - - - - Ft. Scott, Kas.
McKenna, C. S. - - - - Mt. Morris, N. Y.
McNair, F. S. - - - - Elburn, Ill.
McNay, G. P. - - - - Humeston, Ia.
Merrick, C. H. - - - Okawville, Ill.
Metzger, A. E. - - - - Clyde, O.
Morgenroth, E. L. - - - Boltonville, Wis.
Mullett, J. H. F. - - - Cassopolis, Mich.
Newbury, M. C. - - - Hanover, Mich.
Newton, E. H. - - - - Poynette, Wis.
Oberst, J. J. - - - - Belgium, Wis.
Presler, H. A. - - - Montpelier, O.
Rich, R. G. - - - - - Fayette, Ia.
Richmond, F. O. - - - - Sabetha, Kas.
Rimmer, F. - - - - - Chicago, Ill.
Rimmer, T. - - - - Chicago, Ill.
Rork, A. M. - - - - Merrill, Wis.
Rushworth, W. A. - - - Fort Collins, Colo.
Sawyer, F. N. - - - - Chicago, Ill.
Schoedde, B. - - - Beckwith, Wyo.
Scott, J. A. - - - - Minneapolis, Minn.
Sheppard, J. N. - - - Park River, N. D.
Stanley, O. W. - - - - Sioux Falls, S. D.
Stevens, C. W. - - - - Knoxville, Ia.
Sutzin, J. - - - - Minneapolis, Minn.
Thornborrow, J. A. - - - Jacksonville, Ill.
Troxell, R. E. - - - - Chicago, Ill.
Ulm, F. J. - - - - Chicago, Ill.
Van Aken, R. D. - - - Columbus, Wis.
Waterman, G. A. - - - - Storrs, Conn.
Wheeler, E. G. - - - - Pella, Ia.
White, S. J. - - - - E. St. Louis, Ill.
Wiesen, W. J. - - - - Chicago, Ill.
Wright, F. O. - - - - Smithport, Pa.
Ziegenhorn, A. F. - - - - Claytonville, Ill.

AMERICAN VETERINARY COLLEGE.

March 24th.—Degree D. V. S. (Doctor of Veterinary Surgery.)

William Alexander Attfield	Brooklyn, N. Y.
Leo Edward Buckley	New York, N. Y.
Charles Reuben Biederman	Brooklyn, N. Y.
Harry H. Bear	Mount Joy, Pa.
Alexander Joseph Burkholder	Staunton, Va.
Grantley Willoughby Bickell	Haverhill, Mass.
Charles Edward Clayton	Waltham, Mass.
Charles Henry Doepel	Mamaroneck, N. Y.
Frank P. Dorian	Yonkers, N. Y.
William Freeman Davis	Washington, C. H., O.
John Archie Eadie	New Brighton, N. Y.
William C. Ferguson	New York, N. Y.
Charles Edgar Garman	Nora Springs, Iowa
Samuel Glasson, Jr.	New York, N. Y.
John Henry Gardner, Jr.	Norwich, Conn.
Louis Henry Hempelman	St. Louis, Mo.
Gottfried Leonhard Hagenburger	Hettenheim, Germany
Harry Newel Hall	New Haven, Conn.
Mark Edward Johnson	Red Oak, Iowa
Leander Young Ketcham, Ph.G., M.D.	Woodbury, Conn.
Samuel Erdman Lloyd	Govanstown, Md.
Edward Bedell Metcalf	Albany, N. Y.
Albert Francis Mount	Jersey City, N. J.
Charles Henry Martin	Dobbs Ferry, N. Y.
John J. Marshall	New York, N. Y.
Henry Joseph McClellan	Bryn Mawr, Pa.
William Townsend McCoun	Oyster Bay, N. Y.
John Peter Nestler	Jersey City, N. J.
Charles Allen Parkerson, Jr.	New York, N. Y.
John Vernon Prather	Troy Centre, Pa.
James A. Peed	New Castle, Ind.
William Avin Porter	Dunksburg, Mo.
Rudolph Bertram Plageman	Brooklyn, N. Y.
Joseph Bennett Quin	Cincinnati, Ohio
Charles Albert Raque	West Nyack, N. Y.
Napoleon Bonaparte Rhodes	Brookville, Fla.
Warren Lawrence Rhoades	West-town, Pa.
John Edward Rowe, Jr.	Newark, N. J.
Raymond Brooks Smith	Montclair, N. J.
Harry Frank Steele	Titusville, Pa.

Isam Enoch Scripture	Frankfort, Ind.
Harry Edward Styer	Medina, Ohio
Charles Schroder	Brooklyn, N. Y.
William Prout Straughan	Jewett, N. Y.
Shirley Bruce Staples	Alexandria, La.
Robert Smith Todd	Waterbury, Conn.
Howard Stanton Usher	Hollis. Me.
Ernest Lewis Volgenau	New York, N. Y.
Charles Lucian Van Schaick	Brooklyn, N. Y.
Samuel Adam Wright	Long Island, N. Y.
Richard Mitton Weightman	Utica, N. Y.
Frank Potts Williamson	Raleigh, N. C.

MCGILL UNIVERSITY (MONTREAL).—FACULTY OF COMPARATIVE MEDICINE AND VETERINARY SCIENCE.

Degree D. V. S. (Doctor of Veterinary Science.)

Brainerd, E.	Kakoko, Mo.
Campbell, J. G.	Montreal, P. Q.
Cleaves, A. S.	Rindge, N. H.
Dunton, H. B.	Richmond, P. Q.
Denny, H. E.	New York City.
Lamb, A. S.	Montreal, P. Q.
McGuire, W. C.	Shawville, P. Q.
McDougall, J.	Montreal, P. Q.
Orr, O. G.	New Armagh, P. Q.
Plaskett, W. S.	Woodstock, Ont.
Stephens, J.	Huntingdon, P. Q.
Sturrock, T.	Laggan, Ont.
Thayer, S. W.	Cambridge, Mass.
Tracy, A. W.	Sherbrooke, P. Q.
Wylie, M. C.	New Harmony, Ind.

IOWA AGRICULTURAL COLLEGE.—VETERINARY DEPARTMENT.

Degree D. V. M.

A. Bostrom,	Merithan, Iowa.
S. H. Guinn,	Brooklyn, Iowa.
Will Pringle,	Maringo, Ill.
W. Tanner,	Butte, Montana.
H. L. Stewart,	Oakley, Iowa.
J. L. Williamson,	Jefferson, Iowa.
S. T. Miller,	Shelby, Iowa.

ONTARIO VETERINARY COLLEGE.

March 24th.—Degree V. S. (Veterinary Surgeon.)

Francis Abele, Jr. - - - Boston, Mass.
A. M. Adams - - - Canal Dover, O.
Charles H. Adams - - - Stouffville, Ont.
William E. Adams - - - Stouffville, Ont.
James Airth - - - - Port Elgin, Ont.
Albert E. Alexander - - - Strathroy, Ont.
L. A. Anderson - - - Cincinnati, O.
John Armstrong - - - Locust Hill, Ont.
Albert C. Baker - - - Courtland, N. Y
Robert Barnes - - - Poplar Hill, Ont.
William C. Barth - - Leavenworth, Kan.
John M. Boyles - - - Mongolia, Ont.
James Beath - - - - Columbus, Ont.
F. M. Bertron - - - Canisteo, N. Y.
Oscar J. Biehn - - - - Coopersburg, Pa.
Frank M. Blatchford - - - New Hamburg, Ont.
Albert T. Bowman - - - Canton, O.
James L. Brooks - - - - Fingal, Ont.
Edward W. Brumter - - - Wooster, O.
Albert Bryant - - - - Lucan Ont.
Robert Finlay Campbell - - - Whitby, Ont.
Eugene M. Casey - - - New Milford, Pa.
Fred H. Cassels - - - - Tacoma, Wash.
Robert Cassels - - - Wingham, Ont.
George R. Christian - - Glenns Valley, Ind.
William F. Coleman - - - Toronto, Ont.
Robert E. Collins - - - Lovelton, Pa.
Henry L. B. Coote - - - Minnedosa, Man.
C. M. Culbertson - - - - Durham, Ont.
William Davidson - - - Harriston, Ont.
William H. Derr - - - - Wooster, O.
James D. Deyell - - - South Monaghan, Ont.
P. A. Dillahunt - - - - Springfield, O.
Henry Domville - - - - St. John, N. B.
Eugene E. Dooling - - - Syracuse, N. Y.
George W. Dunlap - - - Goodville, Pa.
Nelson D. R. Eakin - - - Toronto, Ont.
Edwin W. Emery - - - - Maumee, O.
Fred Evans - - - - Avoca, Neb.

Albert C. Ewart - - - Wyoming, Ont.
Harry V. Fenn - - - - Colchester, Eng.
John A. Filsinger - - - Syracuse, N. Y.
Duncan Fisher - - - Grandin, N. Dakota
Michael J. Foran - - - Auburn, N. Y.
Charles B. Frederick - - - Freeburg, O.
Frank E Freeman - - - - Belfast, Me.
George D. Gibson - - - Brandon, Man.
Horace M. Gohn - - - Thornhill, Ont.
William T. Graham - - Door Village, Ind.
Frank C. Grayson - - - - Paxton, Ill.
Philip Harrison - - - Bad Axe, Mich.
William Harrison - - - Bad Axe, Mich.
John Hatton - - - - Glenboro, Man.
E. M. Herrington - - - Picton, Ont.
Charles J. Hinkley - - - Odebolt, Ia.
Charles W. Holley - - - Ralston, Pa.
E. J. Hopkins - - - - Newboro, Ont.
Geo. Howell - - - Vernon, Ont.
Arthur M. Humphrey - - Darien Centre, N. Y.
Edwin H. Humphrey - - Remington, O.
Buoy R. Ilsley - - - Weymouth, Nova Scotia
Richard J. Jelly - - - Mossley, Ont.
Edward L. Kalb - - - Rochester, Minn.
Milton J. Kellam - - Rainham Centre, Ont.
Daniel M. Kellogg - - - Reynoldsville, N. Y.
Henry F. Kennedy - - - West Union, Ia.
William H. Kerr - - - - Urbano. O.
Joseph Kime, Jr. - - - Chatham, Ont.
Daniel R. Kohler - - - Kuttztown, Pa.
Karl H. Kolbe - - - Napoleon, O.
Virgil Lathrop - - - - Albany, N. Y.
F. E. Lawton - - - Paris, Ill.
Charles E. Leist - - - - Circleville, O.
John P. Lemon - - - Cresco, Ia.
Frank M. Linscott - - - - Holton, Kan.
Edwin D. Longacre - - - Longacre, Pa.
Charles B. McAndless - - - Ilderton, Ont.
W. J. H. McBride - - - Amherstburg, Ont.
George McCluskey - - Orangeville, Ont.
James McGillicuddy - - - Walford, Ont.
James F. McGregor - - Delaware, Ont.

Alex. M. McKay - - - Morewood, Ont.
Alex. H. McKellar - - - Washburn, Ia.
Arthur McKercher - - - Petrolia, Ont
Ellis McLain - - - Nanticoke, Ont.
John A. McMaster - - - Guelph, Ont.
Harry T. Madden - - - Greenfield, Ill.
R. H. Madill - - - Streetville, Ont.
D. M. Mahomey - - - - Ladoga, Ind.
George G. Manser - - - Linwood, Ont.
John H. Marbes - - - Syracuse, N. Y.
Harry Delos Martin - - - Buffalo, N. Y.
John William Mather - - Rohrsburg, Pa.
W. H. B. Medd - - - - Larchwood, Ia.
J. Harvey Mettlen - - - Wakefield, Neb.
Chester Miller - - - Ottumwa, Ia.
Albert W. Moore. - - - Charlevoix, Mich.
L. G. Moore - - - - Trenton, N. Y.
W. J. Morgan - - - Kingston, Ont.
Bruce D. Munro - - - Whitehall, Pa.
Thomas H. Murray - - Medo, Minn.
Thomas W. Orme - - - London, Ont.
James W. Orr - - - New Hamburg, Ont.
Thomas Packwood - - - Goderich, Ont.
Charles E. Parker - - - Dexter, Mich.
John M. Pattison - - - Bentonville, Ind.
Romanzo Perkins - - - Hardys, N. Y.
Harry H. Post - - - Melville, Ont.
Edwin L. Price - - - Reynoldsburg, O.
C. K. Rhodes - - - Broadway, Va.
H. A. Rose - - - Selkirk, Ont.
Isaac A. Ruby - - - - North Liberty, O.
William H. Salisbury - - Phelps, N. Y.
Harry G. Sands - - - Welliversville, Pa.
Daniel E. Seller - - - Minden City, Mich.
Albert G. Shirley - - - Watford, Ont.
Elvin E. Shoebottom - - Lucknow, Ont.
G D Showalter - - - - Broadway, Va.
Charles J. Sigmond - - Minneapolis, Minn.
Septimus Marshall Smith - - Moosomin, N. W. T.
Andrew Spence - - - Emerson, Man.
Oliver K. Steers - - - - Midland, Ont.
John P. Stovea - - - Shady Grove, Pa.

Elmer E. Sweeley - - - - Warrensville, Pa.
Thomas J. Sweet - - - Moredan, Man.
William B. Switzer - - - Williamson, N.Y.
H. Linwood Tower - - North Adams, Mass.
John B. Turner - - - Butler, Ill.
Alexander S. Tweedley - - Buffalo, N. Y.
Leunis Van Es - - - - Columbus, Neb.
Oscar Verschelden - - - St. Mary's, Kan.
Jacob E. Walcott - - - Napoleon, O.
William H. Walcott - - - Napoleon, O.
Thomas Walden - - Gore's Landing, Ont.
William Bert Washburn - - Richfield Centre, O.
Thomas E. Watson - - - Nelson, Ont.
Henry J. Weld - - - Delaware, Ont.
George Howard Welliver - - Bloomsburg, Pa.
T. Townsend Whitling - - Island Lake, Minn.
Jacob Wilhelm - - - Shakespeare, Ont.
Maurice E. Wilson - - - Estherville, Ia.
E. A. Wootton - - - Wellman's Corners, Ont.
Edwin C. Yoder - - - Kutztown, Pa.
George J. Young - - - - Marshalltown, Pa.
Charles C. Yule - - - Weston, O.

OHIO VETERINARY COLLEGE.

(*April 5th.—Degree D. V. S. (Doctor Veterinary Science).*

Bethune, J. G. - - - No. Pine Grove, Pa.
Boehme, Herman - - - Newport, Ky.
Cantelow, S. H. - - - Brantford, Ont.
Curtis, H. L. - - Little Hocking, Ohio.
Dixon, C. Price - - - Cumberland Gap, Tenn.
Everly, O. W. - - - Holmesville, Ohio.
Freshour, J. W. - - - Covington, Ohio.
Galbraith, G. R. - - - Manhattan, Ill.
Geary, C. K. - - - St. Thomas, Ont.
Haffman, L. R. - - - Centreville, Ky.
James, T. H. - - - - Maysville, Ky.
Marshall, H. - - Cumberland Gap, Tenn.
Miller, Alvin - - - Chillicothe, Ohio.
McCann, A. A. - - River Dissert, Quebec.
Nesbitt, J. G. - - - - Ottawa, Ont.
Ruth, C. V. - - - Torch, Ohio.
Smiser, H. A. - - - Cynthiana, Ky.
Spitler, J. L. - - - Dayton, Ohio.
Ware, J. T. - - - - Paris, Ky.
Willerton, Tom - - - Lynville, Ill.

UNIVERSITY OF PENNSYLVANIA.—(VETERINARY DEPARTMENT).

May —.—Degree V. M. D. (Veterinariæ Medicinæ Doctor).

Connor, John F.	Philadelphia, Pa.
Corson, Percy H.	New Richland, Minn.
Cotton, Charles E.	Prescott, Wis.
Earnest, Charles M.	Philadelphia.
Fitzpatrick, Dennis B.	Philadelphia.
Forsyth, George O.	Pemberton, N. J.
Greeson, James O.	Kokomo, Ind.
James, John Alvin	Aberdeen, Md.
Jefferis, Joseph R.	Wilmington, Del.
Jolly, George O.	Philadelphia.
Koenig, August O.	Philadelphia.
McCurdy, Frank C., A.B.	Tioga, Phila.
Magill, Charles E.	Haddonfield, N. J.
Patterson, Henry G.	Mifflintown.
Paxson, Harry D.	West Chester.
Shields, William A. H.	Philadelphia.
Smith, Evic A.	Philadelphia.
Stuart, James A.	Beverly, N. J.
Stuart, George E. H.	Holmesburg.
Terry, Edward E.	Trevose.
Turner, Henry W.	West Chester.
Walls, Alexander C.	St. Paul, Minn.
Walter, Harry K.	Point Pleasant.
Werntz, William T. S.	Philadelphia.
Willganz, Chris. J.	Buffalo, N. Y.
Young, William, Jr.	Riverton, N. J.

HARVARD UNIVERSITY.—(SCHOOL OF VETERINARY MEDICINE).

June —.—Degree M. D. V.

Cronon, Patrick James	Canton, Mass.
Dowd, Eugene Anthony	Roxbury, Mass.
Naylor, William Alfred	Dorchester, Mass.
Lambert, Horace D.	(?)

Record of Fastest Time Made by Horses.

RUNNING.*

MILES.		
¼	Bob Wade, 4, Butte, Mont., Aug. 20, 1890	0.21¼
⅜	Fashion, 4, Lampas, Texas, Aug, 15, 1891	0.34
½	Geraldine, 4, 122 lbs., N, Y. J. C., straight course, Aug. 30, 1889	0.46
	April Fool, 4, 122 lbs., Butte, Mont., July 31, 1891	0.47
4½ fur.	Toano, 6, 116 lbs., Guttenburg, Jan. 8, 1892	0.54
	Geraldine, a, 115 lbs., Oakland, Cal., Jan. 21, 1893	
⅝	Dr. Hasbrouck, 4, 122 lbs,, N. Y. J. C., Oct. 1, 1892	0.57
	Correction, 5, 119 lbs., N. Y. J. C., Sept. 29, 1893	
5½ fur.	Tormentor, 6, 121 lbs., N. Y. J. C., Oct. 10, 1893	1.03
Futurity course, 170 ft. less than ¾ mile,	Kingston, a, 139 lbs., Coney Island J. C., June 22, 1891	1.08
¾	Domino, 2, 128 lbs., N, Y. J. C., Sept. 29. 1893	1.09
6½ fur.	Wampezo, 3, 93 lbs., Guttenburg, Sept. 7, 1893	1.20½
⅞	Kingston, a, 128 lbs., Monmouth Park, July 12, 1892	1.26
	Little Billie, 4, 96 lbs . N. Y. Jockey Club, Sept. 30, 1894	
	Bella B., 5, 103 lbs., Monmouth Park, July 8, 1890, straight course.	1.23½
1	Salvator, 4, 110 lbs., Monmouth Park, Aug. 28, 1890, against time, straight course	1.35½
	Kildeer, 4. 91 lbs., Monmouth Park. Aug. 13, 1892, straight course.	1.37¼
	Chorister, 3, 112 lbs., New York Jockey Club, June 1, 1893	1.39¼
1m. 20 yds.	Maid Marian, 4, 101 lbs., Chicago, Wash. Park, July 19, 1893	1.40
1m. 70 yds.	Wildwood, 4, 115 lbs., Chicago. Wash. Park. July 5, 1893.	1.44
	Faraday, 4. 102 lbs., Chicago, Wash. Park, July 21, 1893	
1 1-16.	Yo Tambien. 3, 99 lbs., Chicago, Wash. Park, July 19, 1892	1.45½
1⅛	Tristan, 6, 114 lbs , New York Jockey Club, June 2, 1891	1.51½
1 3-16.	Rudolph, 5, 107 lbs., Chicago, Wash. Park, July 15, 1893	1.59¾
	Lorenzo, 4, 104 lbs., Chicago, Garfield Park, Aug. 12, 1892	
1¼	Salvator, 4, 122 lbs., Sheepshead Bay, June 25, 1890	2.05
	Morello, 3, 117 lbs., Chicago, Wash. Park, July 22, 1893	
	Banquet. 3, 108 lbs., Monmouth P'k, July 17, 1890, straight course	2.03¾
1m. 500 yds.	Bend Or, 4, 115 lbs., Saratoga, July 25, 1882	2.10½
1 5-16.	Sir John, 4, 116 lbs., New York Jockey Club, June 9, 1892	2.14¼
1⅜	Ormie, 4, 105 lbs., Chicago, Washington Park. July 7, 1890	2.20¼
1½	Lamplighter, 3, 109 lbs., Monmouth Park, Aug 9, 1892	2.32¾
1⅝	Hindoocraft, 3, 75 lbs., New York Jockey Club, Aug. 27, 1889	2.48
1¾	Hotspur, 5, 117 lbs , San Francisco, April 30, 1891	3.00¾
1⅞	Enigma, 4, 90 lbs., Sheepshead Bay, Sept. 15, 1885	3.20
2	Ten Broeck, 5, 110 lbs., Louisville, May 29, 1877, against time.	3.27½
	Newton, 4, 107 lbs., Chicago, Washington Park, July 13, 1893.	
2⅛	Monitor, 4, 110 lbs , Baltimore, Oct. 20, 1880.	3.44½
2¼	Springbok, 5, 114 lbs., Preakness, a, 114 lbs., Saratoga, July 29, 1875	3.56¼
2½	Aristides, 4, 104 lbs., Lexington, May 13, 1876	4.27½
2⅝	Ten Broeck, 4, 104 lbs., Lexington, Sept. 16, 1876	4.58½
2¾	Hubbard, 4, 107 lbs., Saratoga, Aug. 9, 1873	4.58¾
3	Drake Carter, 4, 115 lbs, Sheepshead Bay, Sept 6, 1884	5.24
4	Ten Broeck, 4, 104 lbs., Louisville, Sept. 27, 1876, against time.	7.15¾
	Fellowcraft, 4, 108 lbs., Saratoga, Aug. 20, 1874	7.19½

* Goodwin's Official Turf Guide.

HEAT RACES.

¼	Sleepy Dick, a, Kiowa, Kan., Nov., 24, 1888	0.21½—0.22¼
½	Eclipse, Jr., 4, Dallas, Texas, Nov. 1, 1890	0.48—0.48—0.48
	Bogus, a, 113 lbs., Helena, Mont., Aug. 22, 1888	0.48—0.48
⅝	Kittie Pease, 4, Dallas, Texas, Nov. 2, 1887	1.00—1.00
	Fox, 4, 113 lbs., San Francisco, Cal., Oct. 31, 1891	1.00 3-5—1.01 1-5
¾	Lizzie S., 5, 118 lbs., Louisville, Sept. 28, 1883	1.13¼—1.13¼
	Tom Hayes, 4, 107 lbs., New York Jockey Club, June 17, 1892, straight course	1.10½—1.12¾
1	Guido, 4, 117 lbs., Chicago, Wash. Park; July 11, 1891	1.41½—1.41
1	3 in 5. L'Argentine, 6, 115 lbs., St. Louis, June 14, 1879	1.43—1.44—1.47¾
1 1-16	Slipalong, 5, 115 lbs., Chicago, Wash. Park, Sept. 2, 1885	1.50½—1.48
1⅛	Gabriel, 4, 112 lbs., Sheepshead Bay, Sept. 23. 1880	1.56—1.56
1¼	Glenmore, 5, 114 lbs., Sheepshead Bay, Sept. 25, 1880	2.10—2.14
1½	Patsy Duffy, a, 115 lbs., Sacramento, Cal., Sept. 17, 1884	2.41¾—2.41
2	Miss Woodford, 4, 107½ lbs., Sheepshead Bay, Sept. 20, 1884	3.33—3.31¼
3	Norfolk, 4, 100 lbs., Sacramento, Sept. 23, 1865	5.27½—5.29½
4	Ferida, 4, 105 lbs., Sheepshead Bay, Sept. 18, 1880	7.23½—7.41

TROTTING—ONE MILE.

Yearling.	Pansy McGregor, f. [race record], Nov. 18, 1893	2.23¾
2-year-old.	Arion, b.c., Stockton, Cal., Nov. 10, 1891, against time	2 10¾
	Silicon, f., 1893	2 15¾
3-year-old.	Arion, c., 1892	2.10½
	Fantasy, f., 1893	2.08¾
4-year-old.	Directum, b'k h., Lexington, Ky. [race record], 1893	2.05¼
	Alix, m., 1892	2.10
Aged.	Nancy Hanks, m., Terre Haute, Ind., Sept. 28, 1892, time record	2.04

TWO MILES.

Greenlander, h., Terre Haute, Ind., Nov. 4, 1893 ... 4.32

THREE MILES.

Nightingale, m., 1893 ... 6 55½

FIVE MILES.

Pascal, g., aged, Fleetwood, 1893 ...

TEN MILES.

Pascal, g., aged, Fleetwood, 1893 ... 26.15

PACING.

Direct, h., aged, 1892	2.05½
Mascot, g., aged, 1892	2.04
Flying Jib, g., aged, 1893	
May Marshall, m., 1893	2.08¼

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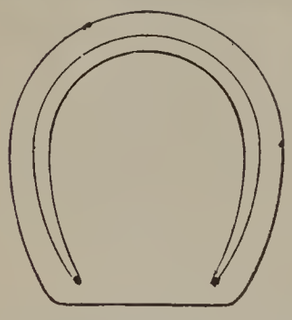

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Bryden, Williamson.
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Clement, A. W.
Dinwiddie, R. R.
Dougherty, Wm.
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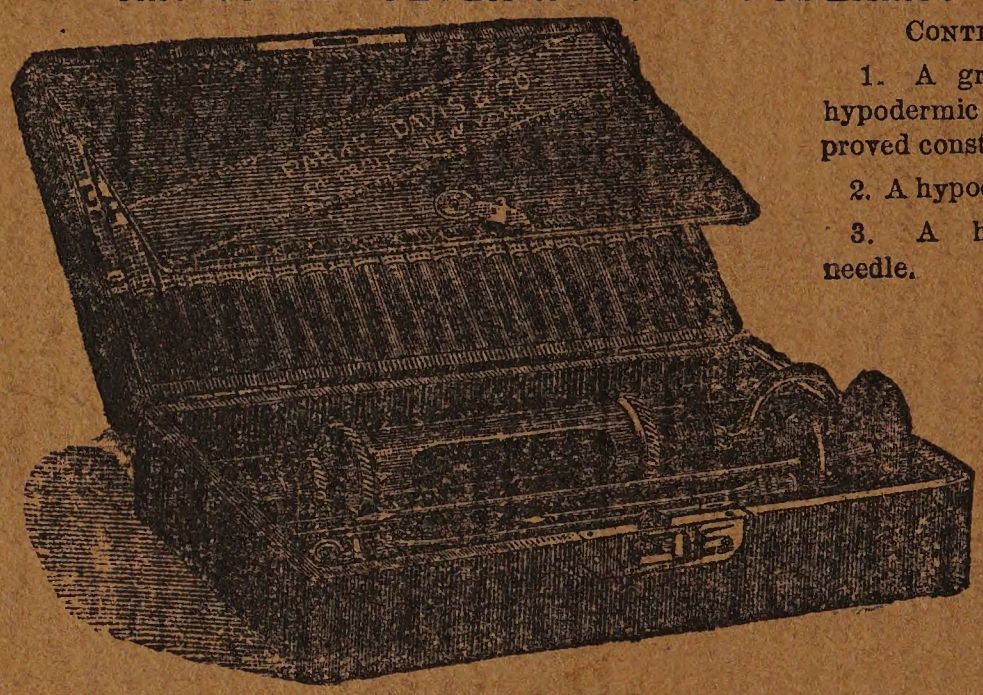

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